BLM LIBRARY
88016719

Volume II

FINAL

ENVIRONMENTAL STATEMENT

PROPOSED FOOTHILLS PROJECT

U. S. Department of the Interior

Bureau of Land Management

Bureau of Land Management
Library
Denver Service Center

BUREAU OF LAND MANAGEMENT
Library
Denver Service Center

88016719

FOOT
.55
FES
V.2

TD
195
.W3
F66
1976
v.2

BLM Library
D-553A, Building 50
Denver Federal Center
P. O. Box 25047
Denver, CO 80225-0047

VOLUME 2

TABLE OF CONTENTS

CHAPTER 9

CONSULTATION AND COORDINATION

History of Coordination Efforts----------9-1
Consultation and Coordination in Preparation of the DES----------9-2
  Federal Agencies Contacted----------9-2
  State Agencies, Municipal Agencies, and Interest Groups Contacted----------9-3
  Comments on Original Draft Environmental Statement----------9-5
Coordination in the Review of the Draft Environmental Statement----------9-8
Public Comments and Responses----------9-12
  Public Comments Period----------9-12
  Public Hearings----------9-12
  Handling and Review Procedures for Public Comments----------9-13
  Letters Received with Substantive Comments----------9-15
  Individuals Testifying at the Hearings----------9-17
  Comments and Responses----------9-19
    Socio-Economic Conditions----------9-19
    Water Resources----------9-40
    Aquatic Resources----------9-70
    Geology, Minerals and Topography----------9-79
    Soils----------9-82
    Terrestrial Resources----------9-84
    Climate and Air Quality----------9-94
    Noise----------9-97
    Visual Resources----------9-98
    Cultural Resources----------9-107
    Recreation Resources----------9-110
    Land Use----------9-124
    Alternatives----------9-128
      Alternatives to the Project----------9-128
      Alternate New Sources of Raw Water----------9-145
    General----------9-165

APPENDICES

Appendix 1. Foothills Ecology Project: The Bighorn Sheep of the South Platte Canyon, Richard E. Jones and Christine C. Jones----------A1-1

Appendix 2. Examples of a Stream Improvement Program, Colorado Division of Highways, U. S. Forest Service and the Colorado Division of Wildlife----------A2-1

Bureau of Land Management
Library
Denver Service Center

Appendix 3. U.S. Fish and Wildlife Service's Updated Reports in Compliance with Section 662 of the Fish and Wildlife Coordination Act--A3-1

Appendix 4. Visual Resources Management System Procedures---A4-1

Appendix 5. Letters with Assigned Index Numbers and Examples of Vote-Type Letters---------------------------------------A5-1

Literature Sources and Information Sources Cited------------------L-1

Glossary---G-1

88016719

BLM Library
D-553A, Building 50
Denver Federal Center
P. O. Box 25047
Denver, CO 80225-0047

TD
195
.W3
F66
1977b
v.2

Chapter 9

Consultation and Coordination

CHAPTER 9

CONSULTATION AND COORDINATION

HISTORY OF COORDINATION EFFORTS

The Director of the Bureau of Land Management assigned the Colorado State Director of BLM lead responsibility for preparation of the initial draft environmental statement (DES) for the proposed Foothills Project in October 1974. The Bureau instituted coordination in the following areas with the federal agencies listed below:

The U.S. Forest Service--use of their draft analysis of environmental impacts relating to the proposed action.

The U.S. Fish and Wildlife Service--consultation with and participation as an active member of the team for wildlife concerns.

The Bureau of Outdoor Recreation--consultation on the recreational and aesthetic effects of the proposed project.

The Bureau of Reclamation--assistance in hydrologic expertise.

The team, led by BLM, represented broad categories of environmental concern, including socio-economics, hydrology, geology, soils, fisheries, climate, air quality, plants, animals, engineering, cultural resources, recreation, and aesthetics. The draft was filed with the Council on Environmental Quality (CEQ) in December 1975 and issued in January 1976. Public hearings were conducted on February 19, 1976.

On July 8, 1976, the Regional Solicitor ruled that the scope of this DES was insufficient as a matter of law and recommended that the Secretary of the Interior postpone his decision on the proposed Foothills Project pending comprehensive analysis.

In response, the Office of the Secretary of the Interior on preparation and planning requested a new preparation plan which was initiated by the Colorado State Director of the BLM. This plan was approved by the BLM Washington Office on February 8, 1977. A new (DES) team was formed in early February 1977. An interagency federal team was established as the core team; participation of each agency is detailed in the following section. In addition, an advisory group comprised of 60 organizations, public agencies, and private individuals provided assistance and expertise in their particular interest areas; a list of the advisory group follows in the Consultation section. A brochure, which described the purpose of the revised draft and invited public participation, was widely circulated in February 1977, when the team began work.

CONSULTATION AND COORDINATION IN PREPARATION OF THE DES

Consultation in preparing the second DES was sought in three forms: federal agencies were contacted; state and municipal agencies and interest groups were consulted; and comments received on the original (February 1976) DES were reviewed.

Table 9-1 lists the federal agencies contacted through formal consultation and coordination procedures and the type and extent of their assistance.

Federal Agencies Contacted

TABLE 9-1

FEDERAL AGENCY ASSISTANCE

Agency	Nature of Contact	Type & Extent of Assistance
U.S. Forest Service	Requested staff and data assistance and preliminary review	Provided one core team member for Forestry-Flora sections; provided recreation and other data; provided team advisor and continual review
Bureau of Reclamation	Requested staff and data assistance; requested sole effort through the Department of the Interior for Raw Water Source Alternatives; requested preliminary review	Provided one core team member for Hydrology sections; provided 16 team advisors to solely produce Concepts A, B, and C of Alternate Raw Water Sources (Chapter 8); provided continual review
U.S. Fish & Wildlife Service (FWS)	Requested staff and data assistance; consultation with FWS concerning any modification of wildlife resources under Sec. 662 of Wildlife Coordination Act (see official report Appendix 4)	Provided one core team member for Fish and Wildlife section; provided consultation and official report in compliance with FWS Coordination Act, Sec. 662; provided continual review
U.S. Bureau of Outdoor Recreation	Requested staff and data assistance	Provided one core team member for Recreation section; provided recreation/aesthetics and other relevant data

TABLE 9-1 (Cont.)

FEDERAL AGENCY ASSISTANCE

Agency	Nature of Contact	Type & Extent of Assistance
U.S. Army Corps of Engineers	Requested data assistance and preliminary review	Provided data assistance and review of preliminary draft in advance of printing
Federal Energy Regulatory Commission (formerly Federal Power Commission	Requested data assistance and preliminary review	Provided data assistance and review of preliminary draft in advance of printing
U.S. Geological Survey	Requested consultation with team and assistance in special areas of geology, minerals, and topography	Provided consultation and assistance
Soil Conservation Service	Requested consultation with team and assistance in special areas	Provided consultation and assistance with soil surveys
Environmental Protection Agency	Requested data assistance and advisory help	Provided data assistance and team advisor
Department of Housing and Urban Development	Requested data assistance and advisory help	Provided data assistance and team advisor

State Agencies, Municipal Agencies, and Interest Groups Contacted

A special effort was made to expand the consultation effort outside of the core team, using 60 advisors from the State of Colorado, from local municipal agencies, and from special interest groups and private individuals. Some advisors contributed as members of various subwork groups; others expressed their concerns in occasional advisory meetings.

Subwork Groups

Subwork groups were formed on the basis of environmental components and chaired by the core team ~~members~~. A list of participants follows:

Archaeology/History Subwork Group

State Historical Society of Colorado (SHPO)
Advisory Council on Historic Preservation
Colorado State Archeologist:
Northern Colorado Educational Board of Cooperative Services, Longmont, Colo.
Park County Historical Society, Bailey, Colorado
University of Colorado, Henderson Museum
University of Denver

Socio-Economics Subwork Group

State of Colorado Division of Planning
Denver Regional Council of Governments
Environmental Protection Agency
Office of Housing and Urban Development

Water Resources Subwork Group

Denver Regional Council of Governments
Colorado Board of Health: Water Quality Control Division
Colorado State Engineer
Colorado Water Conservation Board

Recreation/Aesthetics Subwork Group

Colorado Division of Parks and Outdoor Recreation
U.S. Forest Service

Geology/Minerals Subwork Group

U.S. Geological Survey
Colorado Geological Survey
Consulting geologists (2)

Fish and Wildlife Subwork Group

Colorado Division of Wildlife (DOW)
Rocky Mountain Bighorn Sheep Society
Trout Unlimited

Land Use Subwork Group

Colorado Land Use Commission

Air Quality Subwork Group

Colorado Board of Health: Air Pollution Control Division

Other Team Advisors

In addition to the subwork groups, other interested municipal agencies and interest groups communicated their interests and concerns during various advisory meetings and informal oral communications. These advisors included--

Adams County Commissioners
City of Aurora
City of Broomfield
Boulder County Planning Department
Citizens for Sensible Water
Colorado State University Plant Information Center
City of Denver
Environmental Defense Fund
City of Lakewood
City of Longmont
Pikes Peak Council of Governments
Platte Canyon Water Association
Rio Grande Company
South Platte Canyon Preservation Council
City of Thornton
City of Wheatridge

Comments on Original Draft Environmental Statement

Comments were received on the original (February 1976) DES in the form of letters and testimony from public hearings.

Comments were received in the public hearings from the following:

Honorable William H. McNichols, Mayor of Denver
John R. Bermingham, private citizen
John A. Yelenick, President of the Denver Board of Water Commissioners
Stephen Hart, lawyer
Herbert C. Gundell, Denver County Agent
James T. Smith, United Sportsman's Council
John Retrum, Zero Population Growth, Colorado
Jerry Mallett, Wilderness Resource Institute
Lewis Short, Manager, Lakewood Board of Sewer and Water Commissioners
Robert Weaver, Trout Unlimited
John L. J. Hart, Colorado State Advisory Board
Ken Coors, Denver Chamber of Commerce
Mills E. Bunker, Consulting Engineer
Mary C. Taylor, Colorado Open Space Council
Cynthia Emrick, State Historical Preservation Office
William Slaichert, private citizen

William M. Benight, Concerned Citizens for the Upper Platte River
David A. Curtis, Douglas County Commissioner
Mack D. Dahman, private citizen
William Green, Denver Regional Council of Governments
Alexander Kudalis, private citizen
Paul S. Sternick, Executive Secretary, Denver Metro Association of Plumbing, Heating, and Cooling Contractors
Ruth Steel, private citizen
Joane Patterson, Jefferson County Commissioner
Kay Collins, Denver Audubon Society
Kim Wickholm, Sierra Club
Edward P. Connors, private citizen
Thomas Hornsby Ferrill, Editor, Littleton Independent
Earl Perry, Colorado Whitewater Association
Deane Hall, American Canoe Assn.
Randy Waesche, private citizen
James Sato, Water Resources Engineer
D. A. Rainey, Colorado Historical Society
Hans W. von Barby, Rocky Mountain Bighorn Sheep Society
J. Robert Doyle, Environmental Protection Agency
Merle Jornod, private citizen

Comments were received by letter from the following:

Mrs. James Lane, private citizen
The U.S. Army Corps of Engineers, Omaha
Richard Kithil, private citizen
The Advisory Council on Historic Preservation
U.S. Soil Conservation Service
Colorado State Historical Society
Patti Penland, private citizen
Sierra Club Legal Defense Fund
Bureau of Outdoor Recreation
Margaret Wright, private citizen
Richard Kuehster, private citizen
Eight citizens of the Denver Area
Tim Crislor, private citizen
Roger Brown, private citizen
Twin Cedar Lodge
Metro Denver Water Study Commission
Federal Highway Administration
James Holland, private citizen
Greeley Audubon Society
Marilyn Sherman, private citizen
Martin Bates, private citizen
Frank and Jean Richardson, private citizens
Department of Health, Education, and Welfare
Caroline Hildt, private citizen
Protect Our Mountain Environment
Mr. and Mrs. Remple, private citizens
Douglas County Commissioners
City of Aurora
U.S. Department of Commerce
Mr. and Mrs. Gillings, private citizens
Carroll Newberry, private citizen
Colorado Environmental Health Assn.
Environmental Protection Agency
Swayback Ranche
Denver Regional Council of Governments
League of Women Voters
Barbara Barto, private citizen
James Ogilvie, Denver Water Board
Jack Parsons, Denver Water Board
Fish and Wildlife Service, Salt Lake City, Utah
Martin Fowler, private citizen
Greeley Commission on the Environment
Mills Bunger, private citizen
Pikes Peak Fly Fishers
Kim Wickholm, Sierra Club
John Hart, private citizen
Merle Jornod, private citizen
Enos Mills Branch of the Sierra Club
Environmental Defense Fund

Mr. and Mrs. Carl Santi, private citizens
William Hamilton, private citizen
Colorado Land Use Commissions
June Wilmore, private citizen
U.S. Bureau of Mines
Colorado Department of Wildlife
U.S. Forest Service
Colorado River Water Conservation District
Trout Unlimited
Denver Audubon Society
Mary Cox, private citizen
Public Service Company
Carmello Condino, private citizen
Missouri River Basin Commission
Jefferson County Planning Office
Colorado Division of Planning
Colorado Geological Survey
Colorado Department of Highways
Colorado Department of Health
Colorado Water Conservation Board
Douglas Planning Office
Kathleen A. Judson, private citizen

Many concerns were raised in these letters and comments, such as the consensus that the DES was inadequate in scope, did not deal with the necessity of planning for new raw water sources to operate the proposed Foothills Project, did not sufficiently assess the impact of the proposed treatment plant on the Rocky Mountain bighorn sheep in Waterton Canyon, and many others. The DES addressed all of these concerns, both for the Foothills plant's initial 125 mgd capacity and its proposed 500 mgd maximum capacity and the resultant impacts.

COORDINATION IN THE REVIEW OF THE DRAFT ENVIRONMENTAL STATEMENT

Comments on the DES were requested from the following federal agencies, state clearinghouses, and interest groups. Those who provided comments are indicated by an asterisk.

*Advisory Council on Historic Preservation

Department of Agriculture
    *Forest Service
    *Soil Conservation

Department of Commerce

Department of Defense
    *Corps of Engineers

*Environmental Protection Agency

*Federal Energy Regulatory Commission (formerly the Federal Power Commission)

*Department of Health, Education and Welfare

*Department of Housing and Urban Development

Department of the Interior
    *U.S. Fish & Wildlife Service
    *U.S. Geological Survey
    *Bureau of Mines
    *National Park Service
    *Bureau of Reclamation
    *Bureau of Outdoor Recreation

River Basin Commission
    Arkansas River
    *Upper Colorado River
    Missouri River

Department of Transportation

Water Resources Council

*Response provided

State Clearinghouses
State of Arizona
State of California
State of Colorado
State of Utah

Under the Colorado Clearinghouse system, comments were requested from

- *State Historical Society of Colorado
- *Colorado Division of Wildlife
- *Colorado Division of Water Resources
- *Colorado Division of Parks and Outdoor Recreation
- *Colorado Land Use Commission
- *Colorado Department of Natural Resources
  - *Colorado Department of Health
  - *Water Quality Division
  - *Air Pollution Control Division
- *Colorado Division of Planning

Comments were requested from members of the team advisory groups listed in the preceding section of this chapter and additional special interest groups such as the historical societies of Jefferson County, Douglas County, and Park County, the Colorado Open Space Council, the Institute of Ecology, the League of Women Voters, the National Resources Defense Council, and the Sierra Club.

Approximately 1,380 copies of the DES were distributed. Copies of this draft environmental statement were made available for public inspection at the locations listed below:

Bureau of Land Management:

Washington Office of Public Affairs
18th and C Streets
Washington, D.C. 20240 Phone: (202) 343-4151

Colorado State Public Affairs Office
Room 700, Colorado State Bank Building
1600 Broadway
Denver, Colorado 80202 Phone: (303) 837-4481

Canon City District Office
3080 East Main Street
Canon City, Colorado 81212 Phone: (303) 275-7494

Northeast Resource Area Office
1010 10th Street
Golden, Colorado 80401 Phone: (303) 234-4988

Public Libraries:

Denver Public Library
1357 Broadway, Denver, Colorado 80202

Adams County Library System
10530 Huron, Northglenn, Colorado 80234

Arapahoe County Library System
6840 S. University Boulevard, Littleton, Colorado 80122

Colorado State Library
1362 Lincoln, Denver, Colorado 80202

Douglas County Library System
303 Gilbert, Castle Rock, Colorado 80104

Jefferson County Library System
10200 West 20th Avenue, Lakewood, Colorado 80211

Bailey Library
Bailey, Colorado 80421

Aurora Library
1297 Peoria, Aurora, Colorado 80011

Boulder Library
1000 Canyon Boulevard, Boulder, Colorado 80302

Broomfield Library
Garden Office Center, Broomfield, Colorado 80020

Englewood Library
3400 South Elati, Englewood, Colorado 80110

Littleton Library
6014 South Datura, Littleton, Colorado 80120

Thornton Library
2211 Eppinger Boulevard, Thornton, Colorado 80229

Westminster Library
3031 W. 76th Avenue, Westminster, Colorado 80030

County Office Buildings:

Adams County
450 South 4th Avenue, Brighton, Colorado 80601

Arapahoe County
2069 West Littleton Boulevard, Littleton, Colorado 80120

Boulder County
P. O. Box 471, Boulder, Colorado 80302

Clear Creek County
P. O. Box 547, Georgetown, Colorado 80444

Denver County
Room 451, City and County Building, Denver, Colorado 80202

Douglas County
300 Wilcox, Castle Rock, Colorado 80104

Eagle County
55 Broadway, Eagle, Colorado 81631

Gilpin County
P. O. Box 366, Central City, Colorado 80427

Jefferson County
1700 Arapahoe, Golden, Colorado 80149

Park County
P. O. Box 128, Fairplay, Colorado 80440

Summit County
P. O. Box 1538, Breckenridge, Colorado 80424

Teller County
P. O. Box 248, Cripple Creek, Colorado 80813

PUBLIC COMMENTS AND RESPONSES

Public Comments Period

The public comments period was scheduled to provide the public the opportunity to review and then offer comment on the effects of the proposed action and its alternatives.

The DES was issued on August 11, 1977. The notice of availability was published in the August 12, 1977, issue of the Federal Register. The notice also announced a 45-day public review period ending September 26, 1977, and included a schedule of formal public hearings on the DES to be held in Denver, Colorado. After publication of the notice of availability, copies of the DES were mailed to federal, state, and local government agencies and nongovernment organizations such as conservation groups for their review and comments.

In addition to the Federal Register notice, a national news release was made from the Department of the Interior, Washington, D.C., on August 11, 1977. A similar news release was made on that same day from the Colorado State Office, Bureau of Land Management, to the following within the State of Colorado:

1. Media: newspapers, 154; radio, 59; TV, 10; newsletters, 11; magazines, 7; freelance writers, 4; news service (wires), 3.
2. Groups: environmentalists, 18; law, 3; industrialists, 12; colleges, 5; recreationists, 4: libraries, 2; users, 4.
3. Agencies: county, 3; state, 4; federal, 22.
4. Other: representatives, 5; senators, 2; interested citizens, 35.

Public Hearings

The Department of the Interior conducted three days of formal public hearings on the adequacy of the Foothills DES on September 14 through 16, 1977. An administrative law judge presided over the hearings which were recorded verbatim by professional court reporters. Copies of the full hearings' transcripts were made available for public review in

Bureau of Land Management Offices in Denver and Canon City, Colorado. The hearings panel consisted of the following:

Robert W. Mesch, Administrative Law Judge, Office of Hearings and Appeals, Department of the Interior, Salt Lake City, Utah

Stewart A. Wheeler, District Manager, Canon City District, Bureau of Land Management, Canon City, Colorado

Robert N. Ridings, Supervisor, Pike and San Isabel National Forests, USDA Forest Service, Pueblo, Colorado

Robert K. Lanky, Regional Planning Officer, Lower Missouri Region, Bureau of Reclamation, Denver, Colorado

Colonel Elbert D.H. Berry, Rocky Mountain Area Engineer, Omaha District, Corps of Engineers, Colorado Springs, Colorado.

Delmar A. Broers, Chief, Regulatory Functions, Omaha Distrist, Corps of Engineers, Omaha, Nebraska.

The hearings were conducted at the Denver Public Library, Wyer Auditorium, Denver, Colorado. Sessions were scheduled beginning at 9 a.m., 1 p.m., and 7 p.m. on September 14 and 15 and at 9 a.m. and 1 p.m. on September 16. Of the 399 people attending the hearings during the three days, 132 presented testimony. The hearings were widely announced as indicated in the Public Comments Period section.

Handling and Review Procedures for Public Comments

During the review process, over 500 letters were received from interested citizens, federal and state agencies, and private organizations such as environmental groups, the Denver Jaycees, and realty companies. In addition, testimony was taken from 132 individuals at the public hearings.

All letters and the hearing transcripts have been sent with the final environmental statement to the Secretary of the Interior and Environmental Protection Agency (EPA) and will also be available for public inspection at the State Director's Office, Bureau of Land Management, Colorado State Bank Building, Denver, Colorado; BLM District Office, Canon City, Colorado; and BLM Office of Public Affairs, Washington, D. C.

All letters and testimony were reviewed and considered. Substantive comments, those which presented new data, questioned facts or analyses, or raised questions or issues bearing directly upon the environmental effects of the proposed action and its alternatives were responded to separately.

Each letter received and each person who testified at the hearing was assigned an index number. In the following part of this chapter, substantive comments received are grouped by environmental element (e.g., socio-economic, recreation resources, etc.). The comment was typed verbatim in most cases; these comments are followed by the index number of the agency, organization or person who made the comment. Similar comments received from more than one source have several index numbers identifying the source; these comments were paraphrased wherever possible. The response either identifies that the text of the ES was changed or provides rationale for why the comment did not require a text change. Those comments solely editorial in nature were incorporated within the text of the final ES but were not repeated or responded to in this chapter.

All letters received from federal, state and local agencies, organizations representing groups of people, recognized experts and the applicant are printed in Appendix 5. Letters that did not address the adequacy of the DES were received from various individuals. These were from both opponents and proponents in the form of votes--either for or against the proposed project. Examples of these letters are printed in Appendix 5 following the letters bearing index numbers.

Letters Received With Substantive Comments

Index numbers are listed for only those respondents who submitted substative comments. Letters that did not address the adequacy of the DES were assigned an index number but are not listed below.

Index Number	Agency, Organization or Individual
3	Colorado Geological Survey, Agency
4	Caleb F. Gates, Jr., Denver, Colorado, Citizen
7	Richard Kittril, Morrison, Colorado, Citizen
9	Michael Hydroupzp, Lakewood, Colorado, Citizen
13	Bureau of Mines, USDI, Agency
15	Henry & Needa Bauer, Lakewood, Colorado, Citizen
16	Henry Workman, Denver, Colorado, Citizen
17	Joseph Zalkind, Denver, Colorado, Citizen
18	City of Lakewood, Colorado, Agency
19	A. Lee Cesario, Denver, Colorado, Citizen
21	Linda Pohle, Denver, Colorado, Citizen
23	Elizabeth Seymore, Littleton, Colorado, Citizen
26	Wendell Keller, Denver, Colorado, Citizen
27	Gordon Lindgren, Arvada, Colorado, Citizen
28	U.S. Geological Survey, USDI, Agency
29	Marvin Adams, Wheatridge, Colorado, Citizen
30	Environmental Defense Fund, Organization
32	James Strain, Denver, Colorado, Citizen
33	National Audubon Society, Organization
34	Angela Medbrey, Denver, Colorado, Citizen
35	Richard Stafford, Lakewood, Colorado, Citizen
36	Louis Bansback III, Denver, Colorado, Citizen
37	William Slaichert, Denver, Colorado, Citizen
38	Bureau of Outdoor Recreation, Agency
39	Moras Shubert, Denver, Colorado, Citizen
40	Jeanell Jornod, Lakewood, Colorado, Citizen
41	Department of Health, Education and Welfare, Agency
42	John R. Bermingham, Denver, Colorado, Citizen
43	W. W. Wheeler & Associates, Englewood, Colorado, Citizen
44	National Park Service, USDI, Agency
45	Advisory Council on Historic Preservation, Agency
46	Lucia B. Cowperthwaite, Denver, Colorado, Citizen
47	Paul Kunasz, Denver, Colorado, Citizen
48	John C. Ellis, Denver, Colorado, Citizen
49	Department of Housing & Urban Development, Agency
50	Colorado River Water Conservation District, Agency
52	Barbara Chamberlin, Denver, Colorado, Citizen

Letters Received With Substantive Comments (cont.)

Index Number	Agency, Organization or Individual
53	Bernie Jones, Denver, Citizen
54	Town of Dillon, Colorado, Agency
55	USDA Forest Service, Agency
56	Laurie Walters, Denver, Colorado, Citizen
57	Laura A. Johnson, Denver, Colorado, Citizen
58	American Society of Landscape Architects, Colorado Chapter, Organization
59	Denver Area Labor Federation, AFL-CIO, Organization
60	Ray M. Wainwright, Denver, Colorado, Citizen
61	Joyce H. Tomanek, Denver, Colorado, Citizen
63	J. E. Rollins, Buffalo Creek, Colorado, Citizen
64	R. E. Wiedemann, Denver, Colorado, Citizen
65	Doris B. Kaplan, Englewood, Colorado, Citizen
66	June Wilmore, Denver, Colorado, Citizen
67	Summit County Visitors Service, Organization
68	Chela V. Kunasz, Boulder, Colorado, Citizen
69	State of Colorado, Agency
70	U.S. Environmental Protection Agency, Agency
72	Plan Metro Denver, Colorado, Organization
73	Anthony S. Trumbly, Denver, Colorado, Citizen
74	Denver Water Board, Agency
75	U.S. Bureau of Reclamation, Agency
76	William Moses, Denver, Colorado, Citizen
78	Northwest Colorado Council of Governments, Frisco, Agency
79	Colorado Environmental Health Association, Agency
80	Colorado Open Space Council, Agency
81	Mary Lou Cox, Denver, Colorado, Citizen
82	Terry Reif, M.D., Denver, Colorado, Citizen
84	Ben Harding, Boulder, Colorado, Citizen
85	U.S. Fish and Wildlife Service, Agency

Individuals Testifying at the Hearings

Index numbers are listed for only those individuals who made substantive comments. Individuals who did not address the adequacy of the DES were assigned an index number but are not listed below.

Index Number	Speaker	Representing
92	Barbara Holme	Colorado State Senator
93	Charles F. Brannan	Denver Water Board
96	Alan Canter, Director of Planning	City of Denver
97	Robert Tonsing	Self
99	Jim Lockhead	Self
100	Eric Leaper Director	American Canoe Association
101	John Bermingham	Water Users Alliance
102	Bruce Heitler	Denver Chamber of Commerce
103	Mohamed El-Ashry	Environmental Defense
104	Anne Vickery	Self
106	Lyle Bush	Adolph Coors Company
107	Robert Steenrod	Self
108	Dave Anderson	Water for Colorado Committee, Inc.
110	Edward Rylands	State Builders and Carpenters Council
112	Purnee McCourt	Land Use Workshop of the Colorado Open Space Council
113	Herb Gundell	Self
114	Robert McWhinnie	Self
116	Paul Mahoney	Colorado Mountain Club
117	Noel Hobbs	Self
119	Warren Cruise	Colorado Sand and Gravel Association
120	Lewis Short	Mr. Reitler & Mayor Rickey of Lakewood
121	John Lebertz	Jay Windell
125	John McClay	Self
127	Robert Weaver	Trout Unlimited
129	Toni Worcester	League of Women Voters
130	Hester McNulty	League of Women Voters
131	Paul Rechel	Denver Audobon Society
132	George Saum	Self
133	Ben Harding	Self
136	Lewis Percman of PREACT	Adam Poe
139	Joe Tempel	Self
141	Hank Hinton	Self
144	Joyce Laman	Self
145	William Benight	Concerned Citizens for the Upper South Platte River Area
146	Floyd Conway	Self
147	Charles Wanner	Self

Individuals Testifying At The Hearings (cont.)

Index Number	Speaker	Representing
148	Pat Nagel--Wilderness Workshop	Rose Kapolzyski
151	Joyce Laman--Denver Zero Population Growth	Howard Felt
152	John Morris	Self
155	Harry McNeill	Self
156	Andy Andrews	American Society of Civil Engineers
162	Truman Young	Self
163	Joe Zbylski	Rocky Mountain Bighorn Society
164	Pam Turner	Water Workshop of the Colorado Open Space Council
165	Kevin Markey	Friends of the Earth
167	Richard Rixon	Summit County Board of Commissioners
168	Irving Hook	Self
169	Edward Connors	Self
170	Roger Brown	Colorado Rivers Council
171	Charles Carroll	City of Aurora
173	William Slaichert	Self
177	John Barnes	Self
181	Ken Gowdowski	Self
183	Elizabeth Bostrom	DWB Employee
188	Mayor William Thornton	Bow Mar
189	Mayor Harold Meyer	Littleton
190	G. G. Peterson	Greenwood Village
191	Mayor George Garson	Glendale
192	Rik Toren	Water Task Force Committee
195	Bob Brand	Consolidated Ditches
198	Ronald Blatchley	Water User's Alliance
199	Sally Rawney	Wilderness Society
202	F. W. Montanari	Self
203	A. L. Walters	Colorado Contractors' Association
204	Ginger Gheen	University of Colorado Wilderness Study Group
207	Pauline Plaza	Self
208	Max Loomis	Thornton Water Board
209	Jim Sanderson	Self
212	Jack McCrosky	State Representative
213	Ed Lewis	Self
214	Raymond Bridge	Self
217	Joseph Pierce	Self
218	William Cobern	City of Aurora
220	Don Thompson	Sierra Club
221	Lynn Simonson	Rocky Mountain Council of the Federation of Fly Fisherman

Comments and Responses

Comments and responses which follow appear in the order shown below. Please refer to the Table of Contents in the front of this volume for page numbers.

Socio-Economic Conditions
Water Resources
Aquatic Resources
Geology, Minerals, and Topography
Soils
Terrestrial Resources
Climate and Air Quality
Noise
Visual Resources
Cultural Resources
Recreation Resources
Land Use
Alternatives
  Alternatives to the Project
  Alternate New Sources of Raw Water
General

Socio-Economic Conditions

1. Comment. A large number of respondents challenged the asumption that the human population will continue to grow with or without the construction of the proposed Foothills Project. Moreover, these respondents felt that this assumption was not adequately critiqued or analyzed.

Commenters 49, 50, 53, 69, 70, 74, 92, 104, 132, 144, 151, and 199

Response. An expanded discussion of the population growth assumption was included in the final ES. See Assumption 7, Assumptions and Analysis Guidelines, in Chapter 3.

Population projections from six agencies (see numbered paragraph 2 in the Introduction to the Future Without the Project, Chapter 2) were considered. In all, twelve projections were studied. Relying on the best professional judgement of the agency demographers, the socio-economic subwork group moved to accept the DRCOG projection as the one most likely to occur. The use of one projection is defensible in that the best professional judgment of the demographer was used to make the choice, the DRCOG projection was the middle-of-the-road projection, and the randomization of projections would not alter the analysis greatly due to the minor impact. This is especially true in the socio-econonomic sense that the proposed project will have on the Denver area whether the population remains stable or grows to 3 million people.

2. Comment. Several respondents submitted comments similar to the following comment: "Your statement is further deficient in that you do not consider the impact of projected growth on the social environment. We feel elements such as educational facilities and health services should be assessed for their capability to handle anticipated growth."

Commenters 17, 37, 49, 69, 70, 79, 104, 112, and 207

Response. Since the population will grow with or without the project (see the expanded discussion of Assumption 7, Chapter 3, in the final environmental statement), there will be no impacts on educational facilities and health services due to the proposed project.

3. Comment. Two respondents submitted comments similar to the following comment: "Second, there is an arbitrary delineation of the impact area in that the EIS confines its investigation largely to the geographic area immediately around the project site. While one cannot state with certainty what the impacts of the Foothills Project would be on metropolitan Denver's population, there is at very least the obligation to investigate that instead of arbitrarily assuming that there will be no population impact. The EIS accepts and adopts the population projections formulated by the Denver Regional Council of Governments. However, those very projections assume, among other conditions, the presence of the infrastructure necessary to sustain the level of population growth projected. So, the EIS is in the self-contradictory position of utilizing population projections which assume infrastructure-construction to argue that infrastructure-construction will not impact population!"

Commenters 53 and 69

Response. The assumption that there would be no population impact was based on evidence from past experience (see the expanded discussion of Assumption 7 in Chapter 3). The statement on infrastructure has been deleted from the final environmental statement.

4. Comment. Two respondents submitted comments similar to the following comment: "The Draft does not, however, discuss the problems of air quality in the metropolitan area with the proposed action -- problems which will be compounded by growth brought on by an increase in water supply. This is a very serious omission in the Draft ES."

Commenters 69 and 104

Response. Settlement patterns are discussed in the FES, Chapter 2, Future Without the Project, and in Chapter 8, No Action Alternative.

5. Comment. "These percentages are stated in the EIS; the growth rate from 1900 to 1970 was 2.8% per year, a low growth rate, the growth rate from 1960 to 1970 was 32%. And the growth rate from 1970 to 1977 (from DRCOG's Regional Growth and Development Plan (RG&DP) [was] 27%. Yet the EIS used the ten years of 1964 - 1973 throughout the text and in charts. This ten-year period includes all the rapid growth of the late 60's and early 70's, and clearly avoids the slowdown of the mid 70's. This is misleading and needless to say, unrepresentative of the future."

Commenter 144

Response. See the expanded discussion of Assumption 7, Chapter 3, in the final environmental statement.

6. Comment. "It is noteworthy that this population projection is the only thoroughly developed and officially sanctioned population plan in this area. It is significant, but not mentioned in the Draft Statement at all, is the fact that the use of that projection is, as a matter of Federal policy, a condition precedent to approval of federally financed or assisted utility system programs in the Denver Metropolitan Area."

Commenter 188

Response. The proposed project will not be federally financed. See the expanded discussion of Assumption 7, Chapter 3, in the final environmental statement.

7. Comment. Two respondents submitted comments similar to the following comment: "Another statement that avoids the issue of population growth (page 1-17) is the first footnote in Table 1-4 which is a Summary of DRCOG Revised Population, Treated and Total Water Demands, Denver Water Department Service Area. The footnote reads: The socio-economic subgroup based its projections on three assumptions: due to favorable perceptions and motivations the general public has regarding the Denver area, past growth patterns will continue: the area's job opportunity situation, favorable compared to the rest of the nation's will continue; and the infrastructure necessary to sustain, or enhance, the area's present lifestyle will continue."

Commenter 144

Response. The third assumption in footnote 1, Table 1-4, concerning infrastructure has been deleted in the final ES. The assumption on adequate infrastructure was in error; the population projection shown was not based on this assumption. See the expanded discussion of Assumption 7 in Chapter 3.

8. Comment. Two respondents submitted comments similar to the following comment: "Why aren't there two sets of projections from DRCOG -- one for the population that can be supported with the Foothills Project and one for the population that can be supported with alternate plans. Table 8-1 that's titled Comparison of Impacts of the Proposal and Major Alternatives does not even include population."

Commenters 144 and 151

Response. Two sets of projections were not calculated for the alternatives since an alternative cannot be stated unless there is a valid assumption that it can support the same population. Therefore, in this case, another projection was not necessary. For the assumption underlying the population projections, see Assumption 7, Chapter 3, in the final environmental statement.

9. Comment. Many submitted comments questioning the validity of the assumptions made in the Community Attitudes section, Chapter 2. They felt that this section was weak and lacked knowledge of the elections and surveys.

Commenters 11, 16, 29, 64, 65, 68, 74, 76, 96, 97, 129, 156, 192, and 208

Response. The Community Attitudes section in Chapter 3 of the FES has been expanded to include additional groups that are for or against the proposed project.

10. Comment. Two respondents submitted comments similar to the following comment: "We are unable to ascertain the relevance of the Carley Survey described on Page 2-10 and 2-12 to the proposed project."

Commenters 49 and 74

Response. The survey is related to the public visibility of the project and to the public's attitudes toward conservation. The only survey available at the time of writing related to the attitudes of the public toward the supply of water. A more recent survey by the 4-C Company (1977), partially relevant to the project, is discussed in the Socio-Economic section of Chapter 2 of the final environmental statement.

11. Comment. "Page 5-1 'An unavoidable adverse socio-economic impact of the project would result from the lay-off of 460 construction workers hired during the three-year construction period of the first increment.'

"What about the favorable impact of hiring these workers for three years in the first place?"

Commenter 65

Response. Favorable impacts of hiring construction workers is discussed in the Socio-Economic section of Chapter 3.

12. Comment. "It is my understanding that one of the primary purposes of the DES is to consider not only direct impacts, but secondary impacts as well, on the socio-economic conditions and without Foothills -- with and without Foothills. As I have shown, the DES fails to deal sufficiently with secondary impacts on small firms and businesses -- like my own."

Commenter 141

Response. For the most part, only primary socio-economic impacts were noted. The secondary impacts were considered to be too small to have a noticeable effect on the social and economic systems of the Denver area. Even the primary impacts will not be great. For example, the impact of the first phase of the proposed project on the Denver-Boulder Labor Market Area (DBLMA) will be to add an average of 317 jobs to the DBLMA for three years. This would hardly be noticeable in a labor market (DBLMA) of 725,000 jobs, an increase of 0.044 percent (317 divided by 725,000 = 0.00044). The second through fourth phases of the project would add an average of 160 jobs for 6 years, an increase of 0.022 percent (160 divided by 725,000 = 0.00022). Increases of such low magnitude are not likely to have a noticeable multiplier effect on the service industry labor market or the infrastructure job market.

A small business might receive a noticeable impact if it should receive a subcontract to work on the proposed project. Otherwise small businesses will not receive significant socio-economie impacts.

13. Comment. Several respondents submitted comments similar to the following comment: "In Chapter 2 of the socio-economic implications of the future environment without the proposed Project are not adequately discussed. The cost and continued use of electrical energy for pumping that would be eliminated with Foothills should be addressed. The resulting change in lifestyle and potential loss of horticultural investment need to be evaluated."

Commenters 27, 69, 81, 99, 165, 171, and 212

Response. DOI regulations preclude cost-benefit analyses in environmental statements. The horticulture loss is discussed in the Conservation Alternative, Chapter 8.

14. Comment. Several respondents submitted comments similar to the following comment: "The Draft Statement talks about placing a value on lawns at about $2,000 for the average home. It seems to me that that is extremely low."

Commenters 49, 74, and 114

Response. The estimate of an investment of $2,000 per residence is conservative as stated in the No Action alternative in Chapter 8 due to the fact that an attempt was made to take into account smaller plots in Denver County and multiple dwellings throughout the entire six-county area as well as parks, golf courses, and highway medians which have independent water sources.

15. Comment. "On page 8-12 you seem to imply that any conservation measures would result in the loss of all horticultural investment in Denver. Please make it clear that this is not so. The only type of disaster which would destroy a large portion of the plantings in Denver is a prolonged water supply shortage. I would like you to quantify your predictions of horticultural losses as a function of the treated water deficit (quantity and duration)."

Commenter 84

Response. The rewritten and expanded Future Environment Without the Project (Chapter 2) and the No Action Alternative and the Water Conservation Alternative (both in Chapter 8) of this FES show that the possible horticultural loss is related to a lack of treated and raw water availability.

As noted in the rewritten, expanded version of the No Action Alternative in Chapter 8, the possible horticultural loss to private residences--if the loss was total--was estimated conservatively at $1,127,674,000. The effect on horticulture would begin to occur in 1980 with treatment shortage and in 1990 or about two years sooner without the project and without additional raw water supplies. Average annual flows would not increase after 1990 with, or without, the project (Chapter 2, Future Environment Without the Project).

16. Comment. "If it has any deficiencies in its present form, it does not emphasize strongly enough the adverse effects on Denver area economy of the 'no action' alternative, or of the 'Chatfield' alternative."

Commenter 60

Response. The adverse economic effect of the No Action Alternative would be that a total of $265,084,000 would not be spent over a 10-year period for construction of the project at the 500 mgd capacity increment; approximately $26,508,400 would not be realized by the community as annual income over the 10-year period. This would have a .38 percent annual economic impact on Denver's $7 billion economy, which is considered very minimal.

Also an average of 317 jobs for 40 months would not be created for the construction of the first increment, and an average of 160 jobs for 72 months would not be manifested for the construction of the last three increments of the proposed project. The impact would be the continuance of unemployment.

The adverse impact of the Chatfield Alternative's higher cost is noted in the discussion of it in Chapter 8.

17. Comment. "The third paragraph on page 3-8 appears to be the only attempt made to assess the social impacts of the proposed project other than an assessment of potential accidents and recreation affected. This is by far the weakest section of the environmental impact statement. The author appears to assume that negative social impacts will only occur to persons who are opposed to the project, even though there is no suggestion as to what the negative social impacts might be. The statement not only fails to quantify the negative social impacts (an admittedly difficult proposition), but it even fails to classify the impacts."

Commenter 69

Response. This paragraph of Chapter 3 has been deleted from this FES because it could not be supported without the empirical study mentioned in the paragraph.

18. Comment. Two respondents submitted comments similar to the following comment: "Page 3-8. RE: third paragraph. This paragraph is unrelated to the section. It represents the lack of significant assessment of secondary impacts. The section on income also does not include the additional income of the DWB and its employees resulting from increased water sales."

Commenters 69 and 121

Response. Chapter 3, under the headings "Employment and Manpower" and "Income" discusses the additional income to DWB employees. Additional income to the DWB cannot be calculated accurately because the cost of, and quantity of, new taps are not known at this time.

19. Comment. "In reference to specific statistics, DRCOG predicts the Denver region to have a population of 2,350,000 by the year 2000. Repeated mention of that figure in the EIS is extremely misleading.

"Foothills is concerned with the Denver Water Board's service area which is some 60% of that figure."

Commenter 151

Response. The six-county area statistics were used because the impacts of the proposed project would extend beyond the DWB service; for example, the work force on the project would probably extend into other counties as well.

20. Comment. "On Page 1-21, the statement fails to show in writing the duration for which 460 persons working three eight-hour shifts, seven days a week will be employed to construct the 125 MGD plant. Such information is given in the next paragraph for the 500 MGD plant."

Commenter 156

Response. The text in Chapter 1 of the FES has been revised in response to this comment.

21. Comment. "This impact statement does not give sufficient weight to the overall impact on the state, or the other impacted states. Neither does it deal adequately with the impact of the service area's water stimulated growth in population, and resulting population density created pollution, traffic congestion, costs of population created escalating taxation, and general deterioration in the area quality of living."

Commenter 7

Response. The project will have a minor social and economic impact on the Denver area and even less on the state as a whole and other states. The economic impact of the project would be the expenditure of $26,508,400 annually for a ten-year period and an increase of 0.36 percent in the total $7 billion plus personal income in the Denver area. See the Socio-Economic section in Chapter 3 of this FES.

Essentially there will be no impact on the surface water in the Colorado River watershed at the 125 mgd level. Expansion to 500 mgd level would require development of additional raw water supplies. When full use of the annual reliable raw water supply is reached, the reduction would average an estimated 83,300 acre-feet per year (see Chapter 8, No Action Alternative of this FES). This would remove 11,300 tons of dissolved solids from the basin and increase the salinity concentration of Colorado River water at Cameo, Colorado, by about 11 mg/l and at Imperial Dam, Arizona, by about 7 mg/l.

There will be no water stimulated growth. Please see the rewritten and expanded Assumption 7 in Chapter 3.

22. Comment. "The Draft Environmental Statement does not go into sufficient detail in discussing the ramifications of not properly planning for this growth which will occur to a large extent regardless of whether the Foothills plant is constructed."

Commenter 36

Response. The National Environmental Protection Act requires environmental statements for major federal actions and does not require describing impacts not related to the project.

23. Comment. "First, there is no adequate description of the relevant socio-economic conditions, and hence no adequate projections of possible impacts upon them. An adequate socio-economic description of a community would have to include descriptions of its institutions (government, education, religion, economy, recreation, and social services), its underlying cultural beliefs, values, and norms, and how these social features are related to the physical form of the community. Essentially an adequate socio-economic description tells what human life is like just as an adequate physical environment description tells what animal and botanical life are like. The EIS contains far better descriptions of the flora and fauna and the amphibians and Bighorn sheep than of human life!"

Commenter 53

Response. Environmental statement procedures require that only those environmental elements which will be impacted be discussed in Chapter 3. Since the project will not generate population greater than would in-migrate without the project (Chapter 3, Assumption 7), the socio-economic impacts of the project are of a low magnitude (Chapter 3).

24. Comment. Several respondents submitted comments similar to the following comment: "Page 5-1, Paragraph 3: The first sentence should be revised and expanded in accordance with oral testimony at the public hearing which correctly pointed out that the nature of construction work is that once a particular project is completed or a particular worker's segment of a project is completed that worker thorugh [sic] the construction worker hiring process moves to another project. Therefore, it is not correct to cite the layoff of 460

construction workers at the end of the project as an unavoidable adverse impact."

Commenters 74, 168, and 203

Response. No one can surely predict that other jobs will be available when the construction of the proposed project is completed. If the workers are hired on other projects, that will be analyzed as a positive impact of other projects. However, at the peak employment period there will be 460 construction workers on the proposed project; when the project is completed, there will be no construction workers employed on it. This is considered an unavoidable adverse impact.

25. Comment. "The discussion of time and money invested in horticulture has no empirical basis."

Commenter 69

Response. The time and money discussion relative to horticulture was based on a discussion with Clara Wieder of the South Denver Evergreen Nursery (see bibliography).

26. Comment. Two respondents submitted comments similar to the following comment: "I make these comparisons to describe how poorly the Draft Statement describes the monumentally adverse impact on the people who live in this area which would result from the choice of the no-action alternative. This deficiency must be corrected in the Final Draft or the Federal decision-makers are certain to be misled in their evaluation of the Foothills Project."

Commenters 30 and 188

Response. The No Action alternative has been rewritten and expanded to better show the adverse effects of the no action are in Chapter 8 of the final environmental statement.

27. Comment. "Several references are made throughout the environmental impact statement to an assumed deed to allow people to continue their current lifestyle (e.g., page 3-8, page 3-12, page 3-63). Although lifestyle is not defined, it is apparent that it means allowing people to continue current water consumption patterns. In other words, current consumption patterns have been equated with the most desirable lifestyle. Impacts on the quality of life are then judged according to whether or not current consumption patterns could be maintained. We feel that the above treatment does not amount to an adequate assessment of the impact on 'quality of life'."

Commenter 69

Response. The principal purpose of the project is to enable the DWB to meet projected maximum-day demands in order that DWB customers can irrigate horticulture without restriction during the hot summer months; since the majority of residences have well-tended horticulture, it can be assumed safely that it is a key aspect of the Denver area community lifestyle. Alternatives to the project are discussed in Chapter 8. The secondary impacts of the project will be minimal.

28. Comment. "Secondly, we have found the DEIS inadequate in its analysis of the direct impacts on recreational resources, the socio-economic impact upon South Platte communities and in the information regarding the expansion of the Denver Water Board's service area."

Commenter 80

Response. The text throughout the FES has been revised to better show the direct impacts on recreational resources. Most of the socio-economic impacts will be spread throughout the six county study area and not in the South Platte communities. It is not expected that construction workers from the Denver-Boulder LMA would sell their present homes and take their children out of their present schools to move into South Platte communities for a job lasting a maximum of three and one-third years (see Figure 1-2). The data on the potential expansion of the DWB service area in Chapter 1 of the FES (i.e., Map 1-5) was provided by the DWB. It is their estimate of the area in Denver requiring water from their system.

29. Comment. Two respondents submitted comments similar to the following comment: "The Report indicates that only 460 jobs would be created over a three year period. In the construction industry, where the unemployment rate has fluctuated between 18 and 25 percent over the past several years, 460 jobs is a tremendous improvement. The Report fails to mention the secondary jobs created when a $100 million project takes place. The ratio of secondary jobs to construction jobs is generally figured at a ratio of 5 to 1. We, therefore, feel the Report should indicate that the number of jobs created over a short term period would be in the area of 2300 jobs."

Commenters 59 and 74

Response. Figure 1-2 indicates that for the first 125 mgd of capacity, an average of 317 workers per month would be hired for 40 months. Figure 1-4 shows that the last three increments, up to the maximum capacity of 500 mgd, would require an average of 160 workers per month for 72 months. The overall average number of workers per month for the entire project would be 216 over a 112-month period with the average, as noted above, being lower for the final three increments. The maximum of 460 workers occurs in separate periods of four and five months--one in the second year and one in the third. Therefore, the multiplier (5 to 1) noted in the above comment should apply to 216 jobs rather than to 460, or about 1,080 jobs in the service industry would result from the proposed 112-month project. It should be noted that the respondent's multiplier is considerably higher than that calculated by labor economists, which is about 1 to 2.7 jobs in the service industry resulting from one construction industry job, depending upon the permanence of the construction job. Text has been changed in Chapter 1 of the FES.

30. Comment. "Since this is true, the severe restrictions and dire consequences referred to at pages 2-93 and 8-6 of the EIS, suggesting limitations to winter use rates, loss of fire fighting capabilities, and contamination problems, should be eliminated completely or qualified as being applicable to shortages which are not forseeable for far more than twenty-five years."

Commenter 42

Response. The ES does not suggest that winter use rates, contamination, or loss of fire fighting capabilities would occur but that these consequences could potentially occur if severe water restrictions were encountered due to reduced treated water capability. This reduction in treated water capability will begin in the immediate future without the project and would continue to increase through time.

31. Comment. "Page 8-11. Re: fire fighting. No reason is given in the DES why treated, potable water is required for fire fighting."

Commenter 69

Response. Treated potable water is not needed for firefighting; however, since the DWB does not have a dual water supply system (one raw and one treatment system), treated water is used. The dual system is now discussed under the Conservation Alternative added in Chapter 8 of this final statement.

32. Comment. "As an ecologist, and somewhat of a horticulturist, I am more at home in making the following observations which I consider are inadequacies (or errors in judgement) presented in the Draft:

"1. The assumption that it will take more water per capita with a larger population is wrong. A greater proportion of people will live in congregate housing, with proportionately less irrigated green area per capita."

Commenter 39

Response. This increase is based on historical trend analysis of the per capita use. It would not be correct to speculate on future (year 2010) types of housing and then speculate on a per capita reduction based on that speculation. See the Future Environment Without the Project section in Chapter 2 of the FES.

33. Comment. "The DES is deficient in evaluation and committment [sic] regarding conduits other than No. 27. It is implicit in the DES that additional distribution facilities will be needed in the future. These must be included with the entire system. Information is also needed regarding transport of construction materials and equipment to the dam and treatment plant sites. It appears that repetitive heavy loads may be required to accomplish delivery. If so route identification and extensive mitigation measures (such as railroad delivery or reconstruction of insufficient state roads) will be required to prevent significant impacts."

Commenter 69

Response. According to the DWB, it is impossible to identify future locations of distribution facilities within the Denver metro area specifically linked to this proposal. The transportation of materials and personnel to the area is discussed in the Land Use section of Chapter 3 of the final statement. No significant impacts were determined; therefore, no mitigation measures were discussed.

34. Comment. "The DES describes several kinds of economic impact from this project, but it omits the economic impact of choosing an unnecessarily costly solution to its problems."

Commenter 152

The purpose of this statement was to determine impacts of the project on the environment. Costs are delineated where possible in this final statement to assist the reader in his/her own analysis of cost/benefits.

35. Comment. "What will the cost to water users be for the existing treatment plants to be idle, or only used occasionally, while the Foothills plant is in full use? What is the cost to residents of building the Foothills Project, broken down into how much per average household, for how many years? Could you translate the total figure of $234 million into individual impact?"

Commenter 66

Response. The cost of the project, according to DWB, will be accomplished in three ways: (1) through water revenues, (2) through water development fees (i.e., tap fees), and (3) through cost-sharing devices with other institutions. DWB sources indicate that water development fees, i.e., tap fees, will be the main source of revenue for paying off the Foothills bonds. This means that population not yet in the Denver area will ultimately pay the cost of the project. The individual costs then can be calculated by dividing the cost of the project by the number of new residents in the DWB service area. It is estimated that the DWB service area will have 958,400 residents by 1980 and 1,693,700 by 2010 (Table 8-2), a growth of 735,300. This divided into $264,623,000, the cost of the entire project (500 mgd), equals $360 per capita or $1,440 per family of four.

36. Comment. Two respondents submitted comments similar to the following comment: "Assumption No. 3 on Page 2-93 seems wholly unwarranted. In any case, this should be a matter for analysis in the environmental impact statement rather than an unfounded assumption."

Commenters 69 and 110

Response. It was rewritten to say that current water demands, based on water trend analysis, will continue into the future. See Assumptions subsection of the Future Environment Without the Project in Chapter 2 of this FES for the revised assumption.

37. Comment. "I would like to direct you [sic] attention to Chapter 5 and Pages 5-1. Under the heading, 'Socio-Economic Impacts,' it is estimated that during the three-year life of the project, there will be 43 accidents related to construction, underground mining, and motorized transport.

"That assumption may have been valid in the past, but I must point out that under the new OSHA and COSH rules and regulations governing on-the-job safety, there has been a dramatic reduction in construction accidents. Because of better rules, enforcement, and the presence of compliance officers in the field, the accident rate should continue to decrease. It appears to me the projected rate is high and perhaps should be revised downward."

Commenter 110

Response. The data discussed in the ES were checked out, and the DWB estimates of occurrence of accidents with OSHA rules is still accurate.

38. Comment. "The Water Board survey referred to on Page 2-10 indicated that the public would prefer to have an integrated approach to the water supply program, with a combination of water restrictions, lawn size limits, growth restrictions, recycling, and development of raw supplies. This DEIS totally ignores such an integrated approach."

Commenter 99

Response. The alternatives in Chapter 8 have been expanded to include a full array of possible approaches to meeting the basic water supply situation. The ES does not provide a decision as to which one or which combination would serve these water supply needs.

39. Comment. Several respondents submitted comments similar to the following comment: "Page 3-12. The experience at the Metro Denver Sewage Disposal District this summer indicates that decreased water consumption lowered the flows experienced by their plants. Thus the statement in paragraph 2 should be reexamined."

Commenters 34, 42, 69, 79, and 84

Response. Assuming population increases as forecasted, flows to wastewater treatment facilities may be substantially the same with or without the Foothills Project. If treated water is not available from Foothills, restrictions will first have to be placed on irrigation. This water does not normally flow to wastewater facilities. Wastewater flows to treatment plants would, however, be diminished to the extent that inhouse, inbusiness conservation measures would be effective. Table 2-5 shows that a number of facility expansions are not scheduled until the 1980's and 1990's. If the Foothills Project is not built, these expansions can be cancelled if warranted by lowered flows.

40. Comment. "6. Solid Waste. We are under the impression that a permit will have to be granted for disposal of solid waste. There is no discussion of this. Also, we find no discussion of the hydrology of disposal sites. What will be the effect on ground water?"

Commenter 129

Response. The final statement has been revised in Chapter 1 of the FES.

41. Comment. Two respondents submitted comments similar to the following comment: "The brief discussion on the impact upon wastewater treatment facilities (p. 3-12) is inadequate. Apparently, the DEIS takes the position that growth in the Denver Metro area is inevitable, and this project simply will keep up with growth and not induce it."

Commenters 69 and 136

Response. Text revisions have been made in the wastewater discussion of the Utilities subsection of the Socio-Economics section of Chapter 3 of the FES to more fully explain the impacts.

42. Comment. "In light of the preceding discussion, it seems that the cumulative effects of the Foothills Project and the eight

wastewater treatment plants and the Clean Water Plan (the subject of the Denver Regional Environmental Impact Statement for Wastewater Facilities and the Clean Water Program prepared by EPA Region 8, June, 1977 should have been examined."

Commenter 69

Response. The description of the cumulative effects resulting from the anticipated growth in population in the metro area is beyond the scope of this statement. Services are required to support such a population. Given that such a population will exist in the metro area, this statement has arrayed effects associated with providing a potable water supply for that population. The cumulative effects of this project are discussed in Chapters 3, 5, and 6 of the FES.

43. Comment. "Page 2-30, Paragraph 4: The second and third sentences thereof should be stricken and more up-to-date information provided. In the draft 'Denver Regional Environmental Impact Statement for Waste Water Facilities and the Clean Water Program' published in June, 1977 by the Region VIII, of the U.S. Environmental Protection Agency, it states that the achievement of the goals of the Federal Water Pollution Control Act will not be hindered as a result of point source discharges. In other words, either a sufficient level of waste water treatment is on line or are [sic] proposed to be on line within the time frames required by law."

Commenter 74

Response. This updated information has been incorporated into the Socio-Economics section of this final statement in Chapters 2 and 3.

44. Comment. "There appears to be a discrepancy between statements which predict the effective demand capacity of the 125 MGD addition. Page 1-18 indicates that demands 'could be met until around 1983'. Page 3-8 states that 'additional treatment capacity and more raw water would be required beginning in 1988.'"

Commenter 69

Response. The text has been corrected in the Proposed Action section of Chapter 1 of the FES.

45. Comment. "Page 3-6, Paragraph 4: The first sentence should be clarified to read as follows: 'Expansion to the 500 mgd level will result in an additional $131,084,000 being spent by 2001 (this is an escalated figure equal to $54,680,000 in 1978 dollars), resulting in an economic impact even smaller than that of the first increment.'"

Commenter 74

Response. The parenthetical statement above explaining the effect of inflation has been added to the Socio-Economic section of the FES.

46. Comment. Two respondents submitted comments similar to the following comment: "Page 3-8, Paragraph 1: At the top of the page the total cost of the 500 mgd project is stated to be $264,623,000. The average annual expenditure for the 10 year period should be corrected and should be stated as $26,462,300, not $2,646,230. Even if this correction is made, its significance is questionable. $133,539,000 will be spent over a three year period, and it is difficult to forecast exactly when the additional treatment plant expansions will be made. Therefore, this first paragraph is of questionable utility and probably should be stricken."

Commenters 69 and 74

Response. This typographical error has been corrected in the FES. See Chapter 3, Socio-Economics section.

47. Comment. "Page 3-8, Paragraph 3: This paragraph has no significance to the Income section. Therefore it should be deleted."

Commenter 74

Response. This paragraph has been deleted from the Income subsection of the Socio-Economics section of Chapter 3 in the FES.

48. Comment. "Page 3-8: The concluding sentence of the Human Populations section should be amended to read that the conclusions used to support Assumption No. 7 include among other things the projection figures of the Denver Regional Council of Governments, an analysis of population migration into other arid areas of the world based upon other societal motives (e.g. Israel, Arizona), and a first-hand observation of the factors which have motivated people to migrate to the Denver area in recent years."

Commenter 74

Response. Text changes in Assumption 7, Chapter 3, of the FES have been added to include the above suggestions.

49. Comment. "Page 3-5: Under the heading 'Employment and Manpower': Does this section contain correct estimates? It is suggested that testimony from the public hearings be reviewed to make sure of these projections. Testimony was received concerning multipliers which operate to multiply the effects of the direct employment generated by the proposed project. This section should

be modified to reflect the effect of these multipliers, thereby enhancing the beneficial effects of the project."

Commenter 74

Response. The impact of the first phase of the proposed project on the Denver-Boulder Labor Market Area (DBLMA) will be to add an average of 317 jobs to the DBLMA for three years. This would barely be noticeable in a labor market (DBLMA) of 725,000 jobs; the impact would be to increase the size of the labor market by 0.044 percent (317 divided by 725,000 = 0.00044). The second through fourth phases of the project would add an average of 160 jobs for six years or an increase of 0.022 percent to the labor market. Increases of such low magnitude are not likely to have a noticeable multiplier effect on the service industry labor market or the infrastructure labor market.

50. Comment. "Page 2-111, Table 2-33: Under the heading of EXISTING ENVIRONMENT . . . 'e.' is incorrect. See our comments addressed to the Community Attitudes Section which appears on page 2-10. This statement should be corrected to read: 'A recent survey (1977) indicates that area citizens prefer increasing water supply to institution of water restrictions by a margin of 2 to 1."

Commenter 74

Response. The Community Attitudes section in Chapter 3 of the FES has been rewritten; it includes data from the 4-C study referred to above. Table 2-33 in the Summary section of Chapter 2 has also been revised to reflect the data from the 4-C study.

51. Comment. "Page 2-111, Table 2-33: Under the heading, 'Future Environment . . . '8.b.' states, 'cut back horticulture irrigation.' This is a gross understatement. A review of the statistics makes it clear that the statement should be, 'near elimination of horticultural irrigation.'"

Commenter 74

Response. Table 2-33 in the Summary section of Chapter 2 of the FES has been revised.

52. Comment. "Page 7-2. Chapter 7 does not assess secondary impacts."

Commenter 69

Response. For the most part, only primary socio-economic impacts were noted. The secondary impacts were considered to be too small to have a noticeably effect on the social and economic systems of the Denver area. Even the primary impacts will not be great. For example: the impact of the first phase of the proposed project on the Denver-Boulder Labor Market Area (DBLMA) will be to add an average of 317 jobs to the DBLMA for three years. This would hardly be noticeable in a labor market (DBLMA) of 725,000 jobs, an increase of 0.044 percent (317 divided by 725,000 = 0.00044). Increases of such low magnitude are not likely to have a noticeable multiplier effect on the service industry labor market or the infrastructure job market.

53. Comment. "The secondary impacts of enhancement of growth potential was excluded from the analysis. This was due to the untenable assumption that the project would not alter population growth. Water availability was determined to have no effect on the developability of land. Justifying the Foothills Project on expected population growth which in itself is based on the assumption of no water constraints is a circular argument."

Commenter 69

Response. The assumption that the project will generate new in-migration is empirically invalid--please see the expanded discussion of Assumption 7, Assumptions section, in Chapter 3 of the FES.

54. Comment. "I believe the BLM's staff summary of media reports is misrepresentative. I find few people, if any, backing unbridled population explosion for the Denver Metropolitan area. On the other hand, it is true that some urge controlled and well planned growth, and with that I have no argument, but for the most part, reasonable people are endorsing Foothills to protect a quality of life that we do have in the Metropolitan area."

Commenter 117

Response. Please see the rewritten subsection on Community Attidues in the Socio-Economic section of Chapter 3 that accounts for those people who urge controlled and well-planned growth. The discussion of community lifestyles in the Socio-Economics section of Chapter 3 of the FES discusses the impact of the project on the quality-of-life in the Denver area.

55. Comment. "The effect on the building industry economy that has arisen because of Denver tap allotment program is totally omitted from the report."

Commenter 171

Response. The Denver tap allotment program appears to have had only a temporary effect on the building program. According to the Business and Finance section of the Rocky Mountain News, December 8, 1977, building contracts in Denver, Adams, Arapahoe, Boulder, Douglas, Gilpin, and Jefferson Counties are up 46 percent in the first ten months in 1977 over the same period in 1976.

56. Comment. "Finally, I would like to request that one additional table which contains an error which could lead to miscalculations and misinterpretations be corrected. Specifically, I refer to Table 2-33, entitled 'Summary of Existing and Future Environment.'

"The 1975 human population is listed at 1,402,500. Without Foothills, the year 2010 population estimate is 1,693,700. The obvious conclusion which could be drawn by scanning this table is that without Foothills, the Denver Water Department service area would grow by fewer than 300-thousand.

"This is in direct contradition to current DRCOG growth projections of more like 800-thousand between 1977 and 2010."

Commenter 108

Response. Table 2-33 in the Summary section in Chapter 2 of this FES has been changed in response to this comment.

57. Comment. "Page 5-19, paragraph number 2., 'Employment and Manpower:' This should be corrected in accordance with our comments regarding page -1."

Commenter 74

Response. The text and the table have been changed in the Summary section in response to this comment in Chapter 5 of the FES.

58. Comment. "Page 3-12. The discussion of community lifestyles is extremely inadequate. An alternative interpretation would be that the impact of expanding the proposed facility would be to delay essential adjustments in social behavior required to adapt to the reality of finite water resources."

Commenter 69

Response. The statement's discussion is adequate in that the only impact on lifestyles of the project is as follows: ". . . would be to permit the population in the DWB service area to maintain lifetyles related to present water consumption until about 1988." The main purpose of the project is to permit the DWB to accommodate max-day demands for a longer period. Max-day demands occur in the summer when Denver area residents want to irrigate horticulture. The project will permit them to maintain their horticultural lifestyle for a longer period.

The socio-economic implications of the future environment without the project discussion in Chapter 2, Socio-Economics section, has been rewritten and expanded in the FES.

The cost and continued use of electrical energy for pumping is discussed in Chapter 8 under Socio-Economic Conditions related to the various alternatives.

The changes in lifestyle and potential loss of horticultural investment is discussed in rewritten and expanded version of the No Action Alternative in Chapter 8 of the FES.

Water Resources

1. Comment. "Very little mention is made in the Environmental Impact Statement of water management or recycling whether to homes or for industrial use. Water management is far less expensive than the $265 million cost for the entire project. What would $265 million add to the average Denver water users monthly bill?"

Commenter 4

Response. Water management appears to represent many things. Water use currently experienced reflects management. The planning, construction, operation, and maintenance of the facilities which provide water to the water users of the Denver metropolitan area requires considerable management. The water users exhibit management in their respective use of the water resource. Encouraging a reduction in the use of water is an aspect of management. Measures to reduce the use of water can be implemented voluntarily or involuntarily. During 1977, involuntary restrictions were imposed upon those water users maintaining lawns and gardens. These restrictions have resulted in an appreciable reduction (about 20 percent) in the use of water when compared to previous years.

Water recycling for domestic or industrial usages is still in the experimental stages of development and is, therefore, not discussed in the FES.

Discussion of various management options is presented in the No Action alternative and the Water Conservation alternative in Chapter 8 of this FES.

2. Comment. "If present treatment facilities are used at peak capacity for long periods of time, water quality will deteriorate. No mention was made of possible water quality problems in the EIS as far as I could determine."

Commenter 23

Response. Brief discussion of the effects of overtaxing the DWB treated-water system is presented in the No Action Alternative in Chapter 8 of the final statement.

3. Comment. "The statement should assess the potential for effects of tunnel grouting operations on existing wells in the fractured rocks. Also, effects of the proposed impoundment on ground-water levels in the vicinity of the project area should be addressed, as should potential effects on ground-water quality."

Commenter 28

Response. It is not known whether or not wells exist in the project area. Ground water levels should remain relativley the same due to the fact the South Platte River already recharges the area. Since the diversion will be by conduit, it should not effect the ground water table once it is diverted from Strontia Springs Reservoir to the treatment plant.

The reservoir will be located in a canyon underlain with granitic gneiss. Ground water follows the rising topography of the canyon walls but at a flatter slope. Indications from the investigation borings are that the occurrence of ground water is erratic and that it is controlled by joint systems and shears without the existence of a water table in a true sense (DWB 1973). The quality of South Platte River waters is very high (see Tables 2-16 and 3-6). Ground water quality in the canyon is not known. Detrimental effects on ground water quality are not anticipated.

Materials expected to be encountered along the tunnel alignment are of two distict geologic regimes: a sedimentary complex and a crystalline complex. The sedimentary complex is characterized by an absence of ground water. The crystalline complex is not expected to be very productive of water during tunneling.

4. Comment. "The point is that no clear, defined exposition of historical water use data is presented in the Statement. Therefore, how is one to perform a trend analysis for use in considering the need for additional treating capacity? The only conclusion to be reached from this discussion is that the predicted per capita annual usage upon which the need for the Project is based is highly suspect and in fact, has no sound basis in the Statement."

Commenter 35

Response. The average annual per capita use of water for the 1971-1975 period stated in Chapter 2, Utilities, Municipal and Industrial Water Systems, should be 215 gdc or 181 mgd. Annual per capita use data obtained from the DWB Annual Reports for the period 1971-1975 when compared to the future estimated per capita demands are as follows:

Year	Annual per capita use gdc
1971	214
1972	216
1973	211
1974	225
1975	208
1971-75 mean	215
1976	207

Year	Annual per capita use gdc
1980	226
1990	229
2000	231

The average annual per capita use (1971-75) of 215 gdc is presented on page 2-5 of the DES. The projections for 1980, 1990, and 2000 are shown in Table 1-4. Neither a detailed explanation of the method to project future treated water needs nor a presentation of all basic data was felt to be needed in the ES.

5. Comment. "It is immediatley appartent [sic] from examination of these graphs that the figures supplied in the DWD's January 24, 1977 letter are projections of the peak demands which have a probability of occurrence only occasionally and infrequently. These DWD projections are used throughout the EIS to portray the rule, whereas actual experience indicates these projections are valid only for the exception."

Commenter 42

Response. Table 1-4 presents the estimated water needs related to the projected future population within the DWB service area. Data such as these are commonly used to determine the physical requirements for providing water service to urban areas. The information in this document attempts to demonstrate the basis upon which the DWB has conceived its treatment and transmission capacity needs and future raw water supplies necessary to provide water service to its customers.

Use of the max-day data presented in the DWB Annual Reports for 1971 through 1975 results in an experienced average max-day of 480 mgd. The average population served was 841,400 persons.

The average max-day per capita use for the 1971 through 1975 period was 570 gdc. The following tabulation presents an estimate of the future max-day requirement assuming that the 570 gdc would be the max-day per capita demand for which facilities would be provided.

Year	Population	Max-day demand mgd
1980	958,400	546
1985	1,057,200	603
1990	1,162,900	663
2000	1,434,100	817

Year	Population	Max-day demand mgd
2001	1,460,100	832
2010	1,693,700	965

The max-day demand exceeds the present treatment plant capacity of 520 mgd in all years.

Unless dramatic changes are made by the water users within the DWB service area in their use of water during the peak use period of the year, additional capability to provide treated water is required.

The presentation of data in this reponse is to demonstrate that additional treatment capacity is required using an average of max-day per capita use (1971-75) recently experienced. It is not intended to be used as an alternate for sizing the treatment facility and therefore need not be shown in the text.

The conclusion reached that the projected demand data represents conditions using a probability of occurrence only occasionally and infrequently is essentially correct. However, the planning and sizing of facilities to provide water service normally incorporates provisions to accommodate needs that are anticipated to have apparent minimal probability of occurrence. The climatic factors, temperature and precipitation which influence the use of treated water within the DWB service area are not predictable on a long-range basis. Therefore, the projected demands represent conditions that may be experienced in any given year so as to insure water service capability.

6. Comment. Two respondents submitted comments similar to the following comment: "Tables 2-30 and 3-2 are grossly misleading and should be dropped because they comingle shortages to be expected as a result of raw water supply limitations with shortages to be expected as a result of treatment capacity limitations. The present form of these tables misleads the casual reader into a belief that all of the shortages shown would be cured by the Foothills project, whereas in fact it is only the shortages prior to 1990 which can be aleviated [sic] by the project. No table should be included in the Final EIS which does not clearly, explicitly and prominently distinguish between shortages due to the absence of new treatment facilities and shortages which must occur in any event if no new raw water supplies are developed."

Commenters 42 and 108

Response. Shortages in the amounts of treated water available to DWB water users can result in three ways: (1) Due to insufficient treatment and transmission system capacity, instantaneous treated-water demands may not be satisfied, therefore creating a shortage; (2) the volumes of raw water available for treatment may be deficient in terms of satisfying anticipated monthly or annual demand, therefore creating a shortage; and (3) a system failure could create a shortage.

With an expanding population and the resulting increase in the demand for treated water, all three categories of shortages will necessitate action by the DWB and its water users. The first step is an expansion of treatment capacity in order to continue to satisfy instantaneous peak-use period demands using raw water supplies available from existing sources. The second step involves both the expansion of treatment capacity as necessary and the development of additional raw water supplies.

Footnotes on both Tables 2-30 and 3-2 identify at what point in time raw water begins to impose shortages. With additional raw water supplies and no additional treatment capacity, inability to satisfy the projected demands for treated water would result in not satisfying the anticipated peak-use period demands.

7. Comment. "In this connection, the plant is projected as having a useful life of 75 years, yet a comparison of projections in columns 7 and 9 in Table 2-30 with the corresponding figures in Table 3-2 shows that because of the raw water supply limitation there will be no difference whatsoever in the availability of treated water after 1990 whether Foothills is or is not built. A table making this type of comparison appeared in the 1976 Draft EIS (Table III-2, page III-7). Attachment #5 is a table prepared to illustrate this important point. Such a table should appear early and prominently in the next EIS in order to show how truly limited the usefulness of the Foothills project will be."

Commenter 42

Response. The usefulness of the initial 125 mgd unit of the proposed Foothills Treatment Plant is not diminished in terms of its usefulness as an integral part of the DWB treatment and transmission system complex. It is documented throughout the FES that once the DWB water users approach the full utilizaiton of the reliable raw water supply (312,300 acre-feet), the annual amount of water available per person will begin to decline. See Table 3-2 in Water Resources section of Chapter 3 of this FES. This may or may not result in a reduction in the max-day demand. This would depend upon what measures were implemented to encourage the reduced use of water. The existence of the Foothills plant would contine to reduce the DWB transmission system electrical energy requirements. This situation would exist with or without the development of additional raw water supplies.

8. Comment. "The differences in per capita consumption shown in Tables 2-30 and 3-2 after 1990 can be traced to differences shown in these two tables in the quantity of raw water sold by the DWD to other distributors, (column 6 in both tables,) but there appears to be no logical basis for such differences; the differences should be eliminated from the next statement."

Commenter 42

Response. The differences in per capita use shown on Tables 2-30 and 3-2 should not have been shown after 1990 and have been corrected.

9. Comment. "The differences in per capita consumption shown in Tables 2-30 and 3-2 prior to 1990 are attributable entirely to differences in peak-day useage on hot summer days with Foothills and without Foothills. If Foothills is built, DWD customers will be able to demand and receive all the water they want, whereas if it is not built certain restrictions will have to be imposed on some summer days. The total volume of water involved in these differences will never be as much as 2%. In short, the effect of building Foothills on the amount of water used will be negligible. The Foothills plant would not increase the ability of the DWD system to permit more taps for the homebuilding industry and the next EIS should make this point crystal clear."

Commenter 42

Response. The construction of the Foothills Treatment Plant at 125 mgd would provide the DWB with additional capability to supply treated water without restrictions to meet peak-use period treated-water demands commensurate with the projected growth in population through 1988. The added population would require housing for which water taps would have to be provided. Expansion of both DWB treated-water capacity and raw water supplies will be necessary unless dramatic changes in water use are made by the present and new water users within the DWB service area. Such expansion will accommodate additional water taps.

10. Comment. "Unless and until new raw water supplies are developed the usefulness of the Foothills plant is limited to the alleviation of peak day shortages prior to the time restrictions must be imposed generally as a consequence of supply limitations, which the EIS estimates will occur in 1990. Despite the fact that this is the only usefulness of the project, the analysis of peak day shortages without the project is almost non-existent. Table 1-5 projects these shortages. The table must be revised in any event because of the erroneous figures described in part 1 of this statement, but the manner in which the number of shortage days are calculated as well as the extent of the shortages should be fully described. In this connection, reliance on DWD projections is not recommended.

Attachment #6 indicates how totally unreliable the DWD's peak day projections were as recently as 1973."

Commenter 42

Response. Table 1-5 as noted by the writer presents a projection of the number of days in a given year when the max-day demand would exceed the existing treatment capacity of 520 mgd. As the projected number of days increases and no additional capability to satisfy max-day demands is provided, incresingly more severe use restrictions would need to be implemented in order to protect the DWB treatment and transmission system from failure. Further discussion of the consequences associated with no construction is presented in the FES in Chapter 8, No Action, where Table 8-5 shows the minimum effects on max-day per capita use that would result.

11. Comment. "There is another glaring error in Figure 3-1 besides the use of the inflated consumption figures. A shortage is identified at a projected monthly treated water requirement of 42,630 Acre-Feet/Month. Calculations show this to be 456.7 mgd, far short of the 645 mgd capacity for which the Figure is constructed."

Commenter 35

Response. Figure 3-1 does not attempt to depict the max-day demand for which water treatment capacity is being planned. The intent is to show the monthly volumes of water anticipated to be required and an estimate of the monthly volumes of treated water anticipated to be available.

The volume of water required in July as shown on Figure 3-1 is 42,746 acre-feet (14.9 percent of 286,833 acre-feet). If no shortage were incurred, the mean daily demand for July would be about 1,379 acre-feet per day or 449 mgd. However, in actual operation on any given day, the demand for treated water may be lesser or greater than the mean daily demand. Therefore, the treatment capacity required is determined on the basis of a maximum-day demand to allow for the anticipated occurrence of such a demand.

12. Comment. "You failed to indicate whether or not the DWD will be able to utilize the anticipated 112,900 acre feet of water from the Dillon area as shown on Table 3-3, if the Foothills Project is delayed or rejected. If the DWD cannot use the total amount of water available, what will be the effect on water quality of the Colorado River Basin?"

Commenter 49

Response. The DWB will be able to use all the water without Foothills as discussed in Chapter 2, Future Environment Without the

Proposed Action, and shown on Tables 2-31 and 2-32. Therefore discussion of Colorado River water qualtiy without the 83,300 acre-feet of additional diversion was not necessary.

13. Comment. "Your statement on Page 2-21 that the Moffat System 'is not impacted by the proposal' conflicts with the discussion on Page 1-20 on how the operation of the entire system (DWD) will change with the addition of the Foothills Plant."

Commenter 49

Response. The Moffat collection system will not be impacted by the addition of the Foothills Treatment Plant. The operation of the Moffat Treatment Plant will be coordinated with the other DWB treatment facilities.

The assumption regarding the period of operation of the Moffat statement Plant with the Foothills plant is stated on Page 3-16. The discussion on Page 2-21 of the DES addresses the Moffat Collection System, not the Moffat Treatment Plant.

14. Comment. "On page 2-29, we find a brief discussion of ground water. We request that the Final Statement include an analysis of the extensive ground water supplies in the Denver Basin as an alternate water supply."

Commenter 50

Response. The analysis of ground water as an alternate raw water supply is not presented in Chapter 8 as were a plurality of other raw water sources not described. Economic and legal viability of the raw water sources depicted in Chapter 8 have not been determined. The No Action Alternative in Chapter 8 of the FES has been revised to briefly consider development of ground waters and resulting impacts.

15. Comment. "On page 3-13 under the subheading Colorado River Watershed we find 'Essentially there will be no impact on the surface water in the Colorado River Watershed with the project at 125 mgd.' This terse statement alone is not sufficient. We request the Final Statement discuss why there would be no impact."

Commenter 50

Response. Discussion of impacts within the Blue River watershed of the Colorado River Basin without the project is presented in the No Action Alternative of Chapter 8 of this FES. The diversion of additional water from Dillon Reservoir will occur with or without the Foothills Project as the annual demand within the DWB service area increases. Therefore, those identifiable impacts attributable to increased Dillon Reservoir diversions are expected to be essentially the same with the project at 125 mgd as those without the project.

16. Comment. Several respondents submitted comments similar to the following comment: "Page 1-17 shows how great is the difference between maximum water requirements and annual requirements, both current and projected. Most of this higher amount is stated to be for outdoor use, watering lawns, etc. With water rationing this past summer, it has been demonstrated that a much lower use in the peak season can be maintained. I believe 357 mgd was the top figure used, as reported in the news media. There have been drought years before this and rationing has worked. In a year with plenty of rain, the peak amount could be cut still lower. It seems to me that the EIS should include some statement of this type of information--in former water rationing years, and 1977 too if possible. Also, some comparison between peak use in drought years and peak use in the wetter years. This would help to understand how much water is really needed."

Commenters 57, 66, 84, and 104

Response. The maximum day use under water restrictions in 1977 was 331 million gallons. Without restrictions, a maximum of 506 million gallons per day was reached in 1973. The planning criteria is based on supplying water upon demand without lawn watering or other restrictions imposed, thus reflecting recent trends in the use of water within the DWB service area.

Drought years are not predictable; therefore, the fact that in one year there is plenty of summer rainfall does not allow a utility, i.e., DWB, to reduce its future capability to provide water service so that it is unable to provide satisfactory service during a summer of lesser rainfall. The DWB had two concerns during 1977. One was the much below normal streamflow into its reservoirs and at its diversion sites, and the second was the potential for the max-day demands to exceed present treatment capacity. The first may have necessitated water use restrictions so that adequate carryover storage would be maintained in the reservoirs for the next year. The second concern required restrictions so that the treated-water system would not be overtaxed in 1977.

17. Comment. "If the actual supply of available processed water is being increased, the following information should be provided:

"a) The amount and percentage of increase should be clearly stated.

"b) Alternatives to Phase One, such as expanding existing treatment plants, should be fully analyzed.

"c) Time should be given for the implications of the Denver Water Board's current restrictions on water usage to be seen. Increased awareness of rational water use may change actual usage during the next decade."

Commenter 72

Response. (a) The ability of the DWB to treat raw water will be increased by 24 percent with the Foothills plant at 125 mgd and by 96 percent with the plant at 500 mgd. (b) The DWB has expanded the existing treatment facilities at Marston and Moffat over the past twenty years. Their respective locations, land area available, relationship to available water supplies, and the pumping energy required to distribute treated water are disadvantages which the Foothills Project does not have, and as a result the DWB is not considering such expansion as a viable alternative. (c) Actual usage of treated water can be reduced in the future if increasingly more severe restrictions during peak-use periods are imposed on a permanent basis. No thorough analysis of maximum extent to which existing treatment facilities may be expanded has been undertaken.

18. Comment. "There obviously are typographical errors, but there are also some other areas in which possibly the statement could be elaborated upon. It would be my observation that the benefits of the increased flows in the North Fork of the South Platte River have been ignored. Obviously there are some advantages of having 150 cfs in the stream rather than 15 cfs in a stream channel that has a capacity to carry 1,000 second feet."

Commenters 55 and 198

Response. Flows in the North Fork of the South Platte River would remain the same with or without the project at 125 mgd development level. At 500 mgd, the flows are undeterminable because it is not known which raw water source will be utilized. More discusson is offered in the Raw Water Concepts section of Chapter 8.

19. Comment. "The EIS must, therefore, consider the proposed Foothills project as part of a collection and treatment system and consider the full impacts of both in our opinion."

Commenter 78

Response. The need for additional raw water supplies will develop with or without the proposed Foothills Project. The principal variable is the time frame at which additional supplies are required.

The Foothills Project at 125 mgd would provide capability to treat the raw water supplies available from the existing South Platte and Robert Tunnel Systems facilities. In the event that expansion to 500 mgd becomes necessary as is projected so that the total DWB treated-water capacity becomes 1,020 mgd, additional volumes of raw water will need to be developed.

Since the decision on what specific sources of raw water are to be developed, whether there is a Foothills Project or not, is still pending, this FES has presented in Chapter 8 a general identification and assessment of impacts associated with the various alternative sources of water supply, storage, and transmission that could reasonably be expected to meet the water demands within the DWB service area. Future site-specific environmental assessment will be required for any future significant federal action that is related to the development of alternative water supplies.

20. Comment. "The implication in paragraph 4 is that the capacity of the Marston plant is limited to 210 mgd by it's [sic] supply conduit. This is not true in terms of peak demand situations since Marston lake has a capacity of 17,213 af (5608.9 MG) which is adequate to supply the 50 Mgd deficit for over 100 days. This supply deficiency would only have an effect when all plants were being used for base load, an impossible situation unless use is limited to winter levels the year round."

Commenter 84

Response. The entire Marston Lake capacity of 17,213 acre-feet is not useable. The useable capacity is between 9,637 acre-feet and the 17,213 acre-feet or 7,576 acre feet. Normal minimum content of 9,637 acre-feet is adhered to unless the reservoir is lowered to reduce stratification for potability purposes.

The storage of 7,576 acre-feet would sustain the treatment of 50 mgd for about 49 days. This is reflected in present treatment capability of 520 mgd (Kassler 50 mgd, Moffat 210 mgd, and Marston 260 mgd).

21. Comment. "The 1977 experience should be described in the next EIS in detail and compared with experiences to be expected under the shortages that are forseeable in years to come, regardless of whether the shortages are caused by lack of treatment capacity or restrictions necessitated by lack of adequate raw water supplies."

Commenter 42.

Response. The 1977 experience reflects the implementation of water use restrictions that principally affected the outside use of treated water. If future shortages are to occur, the form that the future measures to curb treated water use may take will depend upon the cause of shortage, treated-water capability and/or raw water supply capability, and the expected severity of the shortage. Discussion of possible conditions without additional treatment capacity is presented in Chapter 2, Future Environment without the Proposed Action, and Chapter 8, Water Conservation Alternative and No Action Alternative.

22. Comment. "This being the case, the major questions which should be addressed by the EIS are: What are the best estimates of the number and severity of peak-day shortages?"

Commenter 42

Response. There is no best estimate of the number and severity of peak-day shortages. The use of such data is intended to portray for the public and the utility management the potential for exceeding treatment capacity. As population growth occurs, the potential number of days of exceedance increases unless water use restrictions are implemented. The greater the potential number of days is exceeded tends to influence the severity of the restrictions. The fact that there is no ability to predict the specific day or days on which exceedance may occur necessitates consideration of measures that would inhibit treated water use during the entire peak-water use period of the year. The severity of the measures to be implemented may be reflective of the anticipated number of days when demand would exceed the available treatment capacity.

23. Comment. "Page 2-91 to 2-93. The section 'Future Environment without the Proposed Action' is actually the 'do nothing alternative'. The format of the DES obscures direct comparisons of alternatives. The meaning of assumption #1, that the total amount of raw water available to the DWB will remain constant, is unclear. Since, as the DES notes elsewhere, the capacity of water storage reservoirs is continually and progressively diminished by siltation, the implication of this statement is that additional water storage facilities will come on line at a rate that balances the gradual deterioration in capacity. If so, these additional facilities are not identified. If existing storage reservoirs are to be dredged to maintain constant capacity, the costs and impacts of this activity are not described."

Commenter 69

Response. Sediment accumulation in large storage reservoirs is generally accommodated by incorporating storage capacity for such accumulation in the total reservoir capacity. The period for which sediment accumulation is generally estimated ranges from 50 to 100 years. The sediment yield within the watersheds above the principal DWB large storage reservoirs generally ranges from low to very low.

24. Comment. "The statement regarding System Improvements is grossly inadequate. Commitment to major construction at Foothills would be

highly inappropriate in the absence of a thorough study and evaluation of the efficiency of the existing DWB water distribution system."

Commenter 69

Response. Transmission system losses are estimated by the DWB to be 6 percent and are reported in the DWB annual reports. An expanded discussion has been added in the Water Conservation Alternative in Chapter 8 of this FES.

25. Comment. "The Draft Statement underestimates the seasonal component of demand, that water used for irrigation."

Commenter 73

Response. The typical residential customer (a family of four persons) used about 191,000 gallons per year (130 gdc) (DWB, April 1974). About 40 percent or 76,000 gallons (52 gdc) was related to irrigation use. Data on commercial, industrial, parks, golf courses, etc., uses of treated water related to irrigation was not available. If one assumes that the 52 gdc represents an average per capita per day use of treated water for irrigation related use, regardless of whether people live in apartments, duplexes, townhomes, or single-family dwellings, this represents about 25 percent of the 1971-75 average per capita per day use (215 gdc). See expanded discussion of irrigation in the Water Conservation Alternative in Chapter 8 of this FES.

26. Comment. "Additionally, if the annual per capita demand is held to the present, before restrictions, of 188 gds which is .203 af/c/yr there will be no shortage of treated water until some time between the year 2000 and 2010 using the population projections on page 8-9 in Table 8-2. If only the already planned 100 mgd recycling plant came on line, 400,292 acre feet of water would be available - 291, 356 acre feet (Figure 8-2, page 8-8 treated water available in 2001 with no project) plus 108,936 acre feet from recyclying [sic] plant -- enough to supply a population of 1,900,700 which far exceeds the estimated population of 1,693,700 to be served in 2010."

Commenter 130

Response. The average annual treated water consumed within the DWB service area during the period from 1971 to 1975 was 215 gdc (181 mgd). Max-day use averaged 570 gdc. Using the DRCOG population projections from Table 1-4 results in the following annual and max-day demand.

Year	Population	Average daily per capita use gdc	Annual volume of treated water required acre-feet	Max-day per capita use gdc	Max-day mgd
1971-75	841,400	215	202,600	570	480
1980	958,400	215	230,800	570	546
1985	1,057,200	215	254,600	570	603
1990	1,162,900	215	280,100	570	663
2000	1,434,100	215	345,400	570	817
2001	1,460,100	215	351,700	570	832
2010	1,693,700	215	407,900	570	965

Existing treatment plant capacity (520 mgd) is shown to be exceeded in 1980 and thereafter. The annual volume of water needed would exceed the present reliable supply (312,300 acre-feet) some time between 1990 and 2000. Holding water use to the 1971-1975 levels does not diminish the need for additional treated water capability and raw water supplies.

If recycling of wastewater for potable uses becomes practical in the event that the health risks are overcome, the potential 100 mgd capacity represents just 20 to 25 percent of the additional treatment capacity projected to be required.

27. Comment. "Demand projections are much inflated and do not reflect even the actual usage. What are the actual consumption rates? What has been the experience in other areas of the State? Can we continue to squander our water supply in such a fashion? The EIS process needs to generate figures which will give an accurate picture of the trends, the possibilities of savings and comparisons with other cities within our region."

Commenter 129

Response. The average annual treated water consumed within the DWB service area during the period 1971-1975 was 215 gdc (181 mgd). The average max-day demand during the same period was 480 mgd (570 gdc). Water use data from other areas would be site-specific, reflecting the lifestyles, commercial, industrial, and other water uses peculiar to that locality. Discussion of potential water conservation measures is presented in Chapter 8.

28. Comment. "There is no mention of increasing the storage capacity for treated water and what effect that action would have in mitigating the 'shortage' problem. It seems to me that increasing the treated water storage capacity could greatly reduce the magnitude of the shortage if not eliminate it because peak day demands tend to be both

few in number and never occurring in bursts of more than several at a time in any given summer. Building a water supply system that meets either the average or root mean square of summer demand is potentially very much less costly than one which has to have a thoroughput equal to the peak demand."

Commenter 132

Response. See the expanded discussion of treated water storage in the Water Conservation Alternative of Chapter 8 in this FES.

29. Comment. "Some tables are technically wrong. Pages 3-10 and 3-11 Tables 3-1 and 3-2, they cannot be based on 1,000 acre feet/month, neither can tables 8-1 and 8-2 on Pages 8-7 and 8-8. It has got to be over 10-thousand foot acre months."

Commenter 155.

Response. The figures are technically correct. The ordinate of the figures are graduated in thousands of acre-feet. Therefore, the peak of the graph in Figure 3-1 represents about 42,000 acre-feet (month of August). The addition of individual monthly quantities thus determined will result in the annual totals shown on the figures.

30. Comment. "In Table 3-2, Page 3-9, with the project at 125 MGD, the treated water average, per capita per [sic] day use, is shown to go from 208 gdc in 1975 to 154 gdc in 2010. the statement fails to outline the environmental impact resulting from such a substantial reduction in water use in a semi-arid climate such as that existing in Colorado."

Commenter 156

Response. The reduction in the average per capita per day use on Table 3-2 is a result of the assumption that additional raw water is not available. Should there be additional raw water supplies developed and the treatment plant expanded to 500 mgd, the average per capita per day use as shown on Table 1-4 is anticipated to be satisfied through 2001. The footnote in Table 3-2 of the Socio-Economic section of this FES has been changed to better show it's intended usage.

31. Comment. "The statement failed to point out that the 260 MGD plant at Marston cannot achieve this treatment capacity under conditions arising from low water levels and increased turbidity in Marston Lake. Under such conditions the treatment capacity of the Denver Water Board system will be less than 520 MGD as stated on Page 2-5 in the Draft Environmental Statement."

Commenter 156

Response. The capacity of the Platte Canyon Inake to Marston Lake is 210 mgd. The normal operational storage in Marston Lake is 7576 acre-feet (or 50 mgd for 49 days if storage is full at the beginning of 49-day period). Operational constraints are acknowledged in Chapter 2, Utilities subsection of Socio-Economic section in this FES.

32. Comment. "I have a few more points: Section 2 describes the present environment. It does not, in the section on lifestyles or in the discussion of water use on pages 2-5 and 2-6, estimate what percentage of the water supplied to Denver Water Board users is wasted."

Commenter 207

Response. The Water Conservation Alternative in Chapter 8 presents measures which may reduce waste.

33. Comment. "It is plain from Figure 3-1 and from the discussion of water resources in Sections 2 and 3 that with or without Foothills, water shortages will occur in Denver by 1988, if conservation measures are not adopted. Even with Foothills at full capacity we can evidently expect adequate water supplies only through the year 2001, if present levels of consumption continue. It seems to me that building Foothills only puts off the hard decisions for a few years. The Environmental Impact Statement does not address these long-term concerns."

Commenter 207

Response. The FES acknowledges the potential for increased water demand after 2001 (see Table 1-4). The long-term concerns are real, particularly since water is a finite resource. However, this FES has addressed the implications of the proposed action principally during the next twenty-three years. Other actions will be required at the turn of the century.

34. Comment. Two respondents submitted comments similar to the following comment. "The first question that obviously comes up when you pick up an EIS is what the proposed action is it's talking about. The summary and report states that the project would also include a water treatment plant with an ultimate capacity of 500 million gallons per day. Yet I note that, according to the figures on page 1-38 and 1-55, both the tunnel feeding the plant and the conduits from it are ultimately designed for a capacity of 700 mgd. I don't quite understand how this jibes with the theoretical upper capacity of the plant."

Commenters 72 and 214

Response. The tunnel is designed to deliver 500 mgd to the treatment plant when the Strontia Springs Reservoir would be at its lowest operating level (5,935 feet). At the highest normal reservoir level, it would be capable of delivering a maximum flow of 710 mgd. No Phase 3 is planned.

The proposed Foothills Tunnel would have a capacity to the treatment plant of 710 mgd with the Strontia Springs Reservoir water surface at elevation 6,002 feet. With the water surface elevation at 5,935 feet, the capacity would be 500 mgd.

The treated-water conduits' (conduit No. 27 and second parallel conduit) ultimate capacity of 700 mgd with the plant at 500 mgd will enable the DWB to meet the max-hour demand for treated water anticipated. This would be accomplished by drawing upon the clear water storage located at the plant site (see Map 1-7) in addition to the plant output. The conduits from the treatment plant which are a part of the treated-water transmission system are sized to meet the max-hour demand. The treatment plant plus clear water storage would provide the necessary treated water to satisfy the max-hour demand. Max-hour demands with the plant at 500 mgd are estimated to be 700 mgd.

Further, current tunnel boring devices are either of a 4-1/2 inch or 10-1/2 inch boring size. Since the 4-1/2 inch machine would not provide an adequate sized tunnel, the 10-1/2 inch machine was proposed by DWB to be utilized for this project. This does give a 1 to 2 inch larger tunnel (710 mgd capacity) than needed but not for the purposes of having a third phase to the plant.

35. Comment. "It also appears that the claim that Foothills will allow the existing life styles to be maintained until 2001 is a misrepresentation. In addition to the inconsistency of the above statement with this claim, the construction schedule seems at odds with the needs. Between 1988 and 1990, the total reliable annual water supply (312,300 ac-ft) will be utilized regardless of the Foothills project. Yet, the 500 MGD expansion facility will be constructed between 1986 and 1998 based on the assumption that additional raw water will be obtained via one of three water supply alternatives. No comment is made as to when the facility will be operable, 1998? If so, then shortages will be realized in the interim."

Commenter 69

Response. If treated-water demands increase as projected, additional raw water supplies will need to be available by 1988. The second 125 mgd unit at the Foothills Treatment Plant would also be required to be operational by 1988. With development of the appropriate raw water supplies and treatment capacity, no shortages would be anticipated between 1988 and 2001, thereby continuing present lifestyles until the year 2001.

36. Comment. "The DIES states (p. 3-13) that with the initial 125 MGD capacity of the plant, there will be no impact on water resources or water quality in the Colorado River Basin. We believe that with the operation of the 125 MGD facility there would still be impacts on the Colorado River Basin and that the siting of the facility precludes all options other than new transbasin diversons (concepts A, B, C) as part of water supply alternatives for needs to be met beyond 1985."

Commenter 78

Response. Quantities of water anticipated to be diverted from the Colorado River Basin with no expansion of the DWB west slope collection and storage systems are anticipated to be the same with the Foothills Plant at 125 mgd and without the plant (see Chapters 2 and 3). Increases in the annual treated-water demand beyond the existing raw water supplies, whether or not additional treatment capacity is provided, will require the development of new water sources.

The potential of exchange of transbasin effluent and acquisition of water rights is not precluded by the proposed siting of the Foothills Plant. Additional studies giving estimates of the quantities of water that may be derived and quantities that are necessary are acknowledged in Chapter 8, Alternate New Sources of Raw Water.

37. Comment. "Additionally, the max-day per captiause [sic] figures as shown in Table 1-4, p. 1-17 begin at 614 gpc for 1980 and increase to 742 gpc by the year 2010. These figures seem unreasonably high in light of the max use day figure of 355 gpc for the drought summer of 1977. In view of continuing DWB watering restrictions, it would appear doubtful that per capita use could almost double in the space of three years."

Commenter 79

Response. The projected treated water demands reflect conditions in which no restrictions in water use are effected. Water use in 1977 reflected restrictions on the outside use of treated water. In 1973 per capita use of water reached a high of 608 gallons on a single day. See additional discussion in the Water Conservation Alternative in Chapter of this FES.

38. Comment. "The figures used in the Draft for projected average per capita consumption and per capita peak day demands are considerably higher than can reasonably be expected to occur under normal conditions. The Draft assumes average per capita consumption

figures starting at 226 gallons per person per day in the year 1980 and increasing to 233 gallons per person per day by 2010 while the maximum day per capita rate of consumption starts at 614 gpd in 1980 and increases by 77 percent to 742 gallons per person per day in the year 2010.

"These figures appear to be considerably inflated when compared with current average consumption trends. Over the last five-year period, the average per capita consumption has been around 210 gallons per person per day. The Draft projects that this rate of consumption will increase by 16 gallons per person per day to the 226 gpd figure within the next three years by 1980. And then over the following 30 year period -- from 1980 to 2010 -- the consumption rate will increase only at a rate of one quart per person per year. No explanation whatsoever is given for this major discrepancy between the actual current consumption trends and projected trends."

Commenter 127

Response. The annual per capita use in 1974 was 225 gdc (DWB Annual Report). The projected treated water demands are derived using a multiple regression analysis technique involving population, precipitation, temperature and time data. The precipitation and temperature data represent drier and hotter conditions than average in order to appropriately size facilities and accommodate the unpredictability of the climatological conditions experienced in the Denver area.

39. Comment. "Table 3-2, for reasons discussed above, does not represent a meaningful assessment of alternative future water requirements in the DWB service area."

Commenter 69

Response. Table 3-2 is not intended to array alternative future water requirements. Paragraph 2, Chapter 3, under Municipal and Industrial Water Systems describes the purpose of the table. Different levels of treated water use are depicted in Chapter 2, Future Without the Project, of this FES.

The annual per capita use in 1974 was 225 gdc (DWB Annual Report). The projected treated-water demands are derived using a multiple regression analysis technique involving population, precipitation, temperature, and time data. The precipitation and temperature data represent drier and hotter conditions than average in order to appropriately size facilities and accommodate the unpredictability of the climatological conditions experienced in the Denver area.

40. Comment. "Re: Assumption #4. 'Current water use trends' described in the DES do not account for cycical [sic] variations inclimate affecting water supply and use. Again, the assumption of population growth being exogenous from water resource development is incorrect; water is obviously a constraint to growth."

Commenter 69

Response. The reliably available raw water supply (312,300 acre-feet) estimate is the result of a simulated operation of the DWB system during the period from 1947 to 1965. The streamflow data utilized reflected the climatic variations experienced during the period. The projected water demands are predicated on the future population, experienced temperature and precipitation conditions, and time. Reliably new raw water supply is discussed under Purposes and Needs section of Chapter 1 and Water Resources section of Chapter 2 of this FES. Projected demands are discussed in footnote 5, Table 1-4, of the Purpose and Needs section of Chapter 1 of this FES.

41. Comment. "Recycling is inadequately addressed, especially the relative cost for recycling in the future."

Commenter 101

Response. Recycling is discussed to the degree data on environmental effects and costs are available in the Raw Water Alternatives section of Chapter 8 of the FES.

42. Comment. "Water Quality. The Denver Metro area has just completed a 208 Water Quality Management Plan. This plan is based on existing flows in the South Platte. If flows are reduced, it would appear that a higher level of treatment at increased costs will be required. Certainly a plan as significant as the 208 Water Quality plan should be incorporated into this analysis."

Commenter 129

Response. The flows in the South Platte River will not be reduced as a consequence of the 125 mgd treatment facility. See Tables 2-31 and 3-3. Some seasonal variation may be expected under 125 mgd project conditions as compared to the projected non- project condition. See Tables 2-32 and 3-4. See the 208 study reference in Water Quality subsection of the Water Resources section of Chapter 2 of the FES.

43. Comment. "Even putting recreation concerns aside, I can't understand how you can describe a water project without talking about the water that is going to be left in the river when you are through. 'We want to see this information in the DES, and we want to see it in

one readily understandable chart, not scattered throughout the report.'"

Commenter 100

Response. The hydrologic information was presented where it was felt it would be the most relevant. Tables 2-31 of the Water Resources section of Chapter 2 of this FES, 2-32 of the Summary section of Chapter 2 of this FES, and Tables 3-3 and 3-4 of the Water Resources section of Chapter 3 of this FES summarize this information. In addition, in Chapter 8, flow impacts are discussed under the heading "Features and Operation" for each raw water concept alternative.

44. Comment. "It would appear that the minimum streamflow release of 60 cfs in the summer would be about all the water in the stream from Strontia Springs to the Platte Canyon Intake Diversion Dam during low flow periods such as was experienced this entire summer. No projections of monthly flows when operating under the exchange plan are provided in the statement; although Table 3-5, which is missing in the statement, may contain this data. If it does not, then the statement should be revised to include a table to show monthly streamflows in this reach as a result of the proposed 'exchange' of 112,000 acre-feet of water to the Strontia Springs Dam."

Commenter 69

Response. The estimates of the proposed exchange reflected in Chapter 8 reflect a decrease in flows downstream of Strontia Springs Dam to as low as 10 cfs (Concept A). Maintenance of larger minimum flows would result in less exchange capability. As stated in Water Resources section of Chapter 3 of the FES, "minimum streamflow requirements, sewage effluent exchange criteria, and supplies derived from water rights acquired but not yet fully defined may reduce the estimated water supplies in the concepts presented." The exchange of 112,000 acre-feet is actually both exchange and acquisition of water rights (see Concept A, Table 8-7). The discussion of exchange is appropriately located in Chapter 8 of this FES. Alternate New Sources of Raw Water, in Concepts A, B, and C.

45. Comment. "On page 2-28 it states the North Fork of the South Platte River was designed to handle a sustained flow of 680 CFS and a peak discharge of 1020 CFS for 'short-lived periods.' The North Fork flows at about 500 CFS now. An additional 580 CFS is needed to handle the additional 500 mgd for the new facilities. It would appear that flows would be in excess of present channel capacity in the North Fork. The DES needs a statement that North Fork will be studied prior to increasing flows above 680 cfs, as increasing flows above this

amount could result in loss of the limited area suitable and available for recreation. (See pages 2-103 and 3-59.)"

Commenter 55

Response. The average flow of a stream does not represent the stream channel capacity to carry water. As is shown on page 2-30, paragraph 5, Water Resources section of Chapter 2 of this FES, instantaneous flows greater than the average have occurred.

The capacity of a natural stream channel increases as the contributing drainage areas increases or, in other words, in a downstream direction. The natural channel of the North Fork between Grant and Bailey was inadequate to accommodate the anticipated Roberts Tunnel diversion; therefore channel stabilization works were implemented. Flows at Grant in June have averaged 255 cfs (Table 2-11) and at South Platte in June 490 cfs. Future flows in the North Fork with the Foothills Treatment Plant at 125 mgd are displayed on Table 3-4. August average flows are estimated to be 325 cfs at Grant and 442 cfs at South Platte. Expansion of the plant to 500 mgd will create a potential instantaneous flow requirement at Strontia Springs Diversion Dam of about 775 cfs (580 cfs more than at 125 mgd). Not all of this flow would have to be provided from the Roberts Tunnel via the North Fork as is discussed in Chapters 1, 3, and 8 of this FES.

46. Comment. "In the second paragraph on page 1-19 there is a discussion of the Denver Water Board having rights to a total average raw water supply of 312,200 acre feet annually. Please explain how this conclusion is reached."

Commenter 50

Response. The existing DWB facilities which collect, store, and divert raw waters from various locations in the South Platte River and Colorado River watersheds are operated pursuant to water rights obtained under Colorado Water Law. The reliable average annual water supply resulting from the operation of these facilities is estimated to be 312,300 acre-feet (see Table 2-9).

47. Comment. "Page 3-14, last paragraph: Average flows are often cited but are of little value unless maximum and minimum flows are also included."

Commenter 69

Response. For the period 1964-1973 the historic flow of the South Platte River at South Platte varied from a maximum of 5,040 cfs in 1970 to a minimum of 37 cfs in 1964. Estimated average monthly discharges of the South Platte River below Strontia Springs Dam with the project at 125 mgd are shown on Table 3-5. Information on maximum and minimum flows at various locations is presented in the Water Resources section of Chapter 2 (Table 2-14). The discussion of maximum instantaneous diversions at Strontia Springs and Platte Canyon Intake is presented in Purpose and Needs section of Chapter 1 and in the Water Resources section of Chapter 3 in the FES.

48. Comment. Several respondents submitted comments similar to the following comment: "The purpose of this hearing is to address the adequacy of the Draft ES. This Draft discusses the environmental impact on the area immediately around the proposed projects. The Draft also describes various social, economic and environmental aspects of the present Denver metropolitan area. However, it does not address the environmental impact of greatly increasing the treated and raw water supply of a large, water-hungry city situated in the middle of a semi- arid region."

Commenters 104, 147, 169, 173, and 220

Response. This is a site-specific project-oriented environmental statement. It is not meant to be an overview ES for Denver growth; therefore, the information presented does not address current lifestyles' correctness or incorrectness. This question is more appropriately left to local options. In Chapter 3 of the FES, it is stated that the major impact is still the maintenance of current lifestyles for the DWB service area until 2001.

49. Comment. Two respondents submitted comments similar to the following comment: "But, I think that chart amply shows that the projection in the EIS, in fact, is not an extension of past history. You can sort of guess where it came from, it is an extension of the peaks, and what this constitutes then is terribly misleading figures, and they have done the same thing with peak uses. They have misled, they have exaggerated the shortages, they have exaggerated the peak day shortages, and this whole thing, every table that exists in the Impact Statement dealing with water figures is wrong and must be redone."

Commenters 92 and 101

Response. This information was taken from DWB historical water use data. Where a projection is shown, the historical trends were analyzed to determine future conditions. This analysis has shown peak day shortages in the past and it may be assumed that given like future conditions these shortages will reoccur and, in fact, given increased consumption, they will increase in occurrence. The record of the DWB is not one of system failure and inability to provide treated water service. Planning criteria of utilities generally calls for the consideration demand conditions which are not expected to be frequently experienced.

50. Comment. "It is our strong suggestion that these problems with the meaning of gcd be clearly described and that any conclusions on individual water use be avoided entirely."

Commenter 74

Response. The gallons per day per capita (gdc), on an average annual basis, is utilized as a unit of analysis throughout the text of the statement. It is clearly described in various locations throughout the text. The use in drawing conclusion on an individual basis cannot be avoided, especially in Chapters 3 and 8.

51. Comment. "It is in this area of the future availability and costs of water to the consumer without the Foothills Project that I feel this Draft Environmental Statement does not adequately address."

Commenter 119

Response. The future availability of water has been discussed in Chapter 2 of the statement in the Future Environment without the Project section. ES preparation policy excludes a detailed discussion of cost analysis.

52. Comment. "As I say, the final Statement should explicitly state the source of these fundamental figues [sic]. It is just incredible to be holding this hearing on the basis of wrong facts."

Commenter 101

Response. The final ES attempts to show sources where all basic data were derived.

53. Comment. Two respondents submitted comments similar to the following comment: "Paragraph 2. Since the reliable annual water supply would be inadequate to meet annual demand between 1985 and 1990, you 'should mention in [the] final document the socio-economic implication that -- tremendous pressures will be brought to bear to convert agricultural water supplies to municipal supplies on the Front Range.'"

Commenter 96 and 218

Response. The potential source of raw water could be utilized at such time as the raw water becomes a limiting factor along with many other potential sources. Chapter 8, Raw Water Alternatives, attempts to depict three concepts which could be developed. It was impossible to describe every possible method." See also the discussion on agricultural conversion, Land Use subsection of Future Environment Without the Project section, Chapter 2, of the FES.

54. Comment. "Table 2-15 Page 2-27 in the DES is utterly false. There have been no 100 year 20 day floods, run off yes, but no flood of that duration. In fact all of the tables in the DES are preposterous based on Aurora's five year average per capita consumption of 126 gallon/day. Why this tremendous difference as compared to Denver's 208 gallons, 65 percent more. Aurora is metered, Denver is 54.5 percent unmetered."

Commenter 155

Response. As shown in Table 2-15, analysis of the historical data indicated that such flood peaks and volumes may occur. Historically there have been 100-year floods of that duration. It is not known why there is a difference between Aurora and DWB service area average annual gdc. However, it may be assumed that the larger amounts of industrial and commercial enterprises in the DWB service area and the large number of unmetered users would tend to raise the gdc.

55. Comment. Two respondents submitted comments similar to the following comment: "208 water quality planning is mentioned only once, and then in a cursory manner that it is taking place in the Denver Metropolitan Area. The entire state is engaged in 208 planning which will be a twenty-year road map for the future of stream classifications and the measures and treatment necessary to meet these classifications."

Commenters 130 and 136

Response. The water quality discussion has been expanded and rewritten in the final statement to include discussions of the 208 Program. See Water Resources section, Water Quality subsection, in Chapter 2 of this FES.

56. Comment. "The DEIS estimates the salinity increase at Imperial Dam resulting from the 500 MGD phase of this project at 7 mg/l (page 5-2), and also discusses a number of direct impacts on west slope fisheries resulting from additional diversions (Chapter 8). It does not go into detail on the secondary effects of these additional diversions, however. The final Environmental Statement should address these west slope water quality concerns and recommendations in more detail."

Commenter 69

Response. The ES does not estimate a salinity increase of 7 mg/l at Imperial Dam with the project at 500 mgd. The 7 mg/l increase is related to the No Action Alternative in Chapter 8 and the DWB increased diversions through Roberts Tunnel pursuant to its existing water rights. Salinity increases related to increased transmountain diversions with the project at 500 mgd are presented in Chapter 8, Alternate New Sources of Raw Water. Secondary, effects of this salinity are not discussed in this FES. See explanation at the beginning of the Raw Water Alternatives section of Chapter 8 of this FES.

57. Comment. "Other environmental impacts which should be covered include:

> "- Raw water flows and channelization problems on the various streams are not adequately described, particularly for the 500 mgd level. This is particularly true for the North Fork of the South Platte below Grant and the flows to be anticipated through the City of Denver."

Commenter 42

Response Raw water flows are discussed in the text in various chapters, and various tables depict these flows for several rivers, including the South Platte River System. See the Water Resources section of Chapters 2, 3 and 5 and Tables 2-7, 2-11, 2-13, 2-14, 2-15, 2-31, 2-32, 3-3, and 3-4.

58. Comment. "Table 1-5: The values under the heading 'Number of Days When Demands Exceeds 520 mgd' present the numbers 13, 63, and 73. These values should be changed to read 15, 40, 64, 105, and 134 respectively. This change is based on recent updates of the material contained in the DWB's 'Methods of Meeting Max Day Consumption Requirements.' It should be noted that these values are merely statistical values at which demand can exceed a chosen value of 520 mgd. During periods when delivery capacity is reduced by the operational constraints mentioned earlier more days of demand exceeding delivery capability will occur than are shown by the values indicated above."

Commenter 74

Response The table was presented merely to show that it is projected that demand will exceed capacity for a steadily increasing number of days each year. Thus, it was not considered necessary to change the figures.

59. Comment. "Page 2-113, Table 2-33: Under the heading, 'Existing Environment . . . ' 4.d. This statement is irrelevant to the issues at hand. No federal action has been requested which will affect the salinity levels of the Colorado River. Therefore, any reference to

salinity levels in the Colorado River is confusing to the reader. This reference must be eliminated."

Commenter 74

Response The salinity level of the Colorado River is a part of the existing environment; without the project, salinity would increase as shown in Table 2-31, as revised in the Summary section of Chapter 2 of this FES.

60. Comment. "Page 3-9, Table 3-2: This table needs revision in order to eliminate the misinterpretation that many readers obtained and expressed at the public hearing. Since the Denver Water Board is a continuing agency responsible for delivering the service to meet the needs of the people it serves, it is unrealistic to assume that raw water will not be developed as needed. Therefore, this table should at least have added to it columns which represent projected facts assuming an unlimited raw water supply."

Commenter 74

Response Without specific elements in the Foothills Project proposal identifying measures to be taken to provide the needed water as depicted in Table 3-2 of the Socio-Economic section of Chapter 3 of this FES, no realistic assumption may be shown as to that water's definite availability. The table reflects this unknown. For further discussion of raw water, see the Raw Water Alternatives section in Chapter 8 of the FES.

61. Comment "Page 3-10 and 3-11: Figures 3-1 and 3-2 are misleading. The graphs should be amended to show the bar graphs which indicate average percentage of raw water consumed per month. Then it should be indicated that the line graphs are really connections of the average quantities per month and the lines connecting the graphs average should be shown. The shortfall of 754 acre feet should be shown as an average not necessarily occurring at the times indicated in the graph. It should also be emphasized that the estimated shortfall is due to an assumed lack of raw water. Note: similar remarks made concerning Figures 3-1 and 3-2 on Pages 3-10 and 3-11 also apply to Figures 8-1 and 8-2 on Pages 8-7 and 8-8. In addition, the shortages shown on these figures are apparently based on information from Table 2-30 whose deficiencies were commented on earlier."

Commenter 74

Response Utilization of bar graphs would be another acceptable graphic method of showing the water shortages in Figures 3-1 and 3-2. However, it is felt that line graphs are very adequate as well; no change was made in the FES.

62. Comment "Page 3-65: The 'b' subparagraph under the 'Water Resources' Environmental Element should be stricken since under subparagraph 'a.' it is noted that the impacts of the 500 mgd are presented in Chapter 8. In addition, this reference to salinity is not only irrelevant but also confusing to the reader."

Commenter 74

Response No matter which raw water concept is utilized, a maximum instantaneous demand for raw water would exist at the 500 mgd operating level on the South Platte River System at the diversion point. No text changes were made in the FES.

63. Comment "Page 5-2, WATER RESOURCES: References to the Colorado River Basin need to be revised. [In] The first paragraph in the 'Water Quality' Section, the first sentence correctly points out that these diversions will occur, notwithstanding the Foothills Project. Therefore, it is incorrect to cite the incareses [sic] in salinity, etc. in the Chapter 5 because it infers that effects on the Colorado River Basin which cannot be avoided are realted to the Foothills Project."

Commenter 74

Response References to salinity increases occurring independently from Foothills impacts have been omitted from Chapter 5 of the FES.

64. Comment. "Table 2-30 projects the impact of a population growth as predicated by DRCOG with no new water treatment capacity added, and Table 3-2 projects the impact of the same population growth with the first phase of Foothills -- 125 million gallons per day of new treatment capacity -- built as planned.

"The joker is that in both cases it is assumed that not one drop of additional raw water will be developed. Thus, when the tables are laid side-by-side, when the present raw water surplus -- some 70-thousand acre feet -- disappears, the same number of people eventually will use about the same amount of raw water per day, on an annual basis. In other words, the raw water availability becomes the ceiling, and an increasing population makes less available on a per capita basis.

"Therefore, I think it would be wise either to remove Table 3-2 on the grounds that it contains only part of the story and can be easily misinterpreted -- as it has been already -- or else to add tables showing impacts of Foothills at 250 million gallons, at

375 million gallons and the full 500 million gallons, with adequate raw water assumed in all cases."

Commenter 108

Response With no additional treatment facilities, there will be a treated-water shortage prior to 1980. With construction of the 125 mgd plant, there will be a treated-water shortage prior to 1990 with or without increased water supply. With expansion to 500 mgd and the necessary water supply increased, there would be a treated-water shortage in about 2001. Thus, Table 3-2 sets the pattern for the different levels of development, and no additional tables are considered necessary.

65. Comment. "Page 1-17. The quantitative and methodological basis of the projection in Table 1-4 is not provided. The assumptions contained in footnote 1 are controversial, and do not describe a plausible range of alternative futures. The figures used to rationalize the need of the project are based on 1974 rates. The 1977 consumption/use rates are probably significantly lower than previous years and should be reflected in the DES analysis since they represent the effect of conversation."

Commenter 69

Response Permanent acceptance of water restrictions, as demonstrated in the summer of 1977, as a plausible alternative future for Denver metro population is a matter of conjective at this time. However it is discussed in detail in the Alternatives section of Chapter 8 of this FES. The quantifiable projections are based on historical trend analysis within the DWB service area. The 1977 summer water restrictions and consumption savings are discussed in the Water Conservation Alternative in Chapter 8 of this FES.

66. Comment "Page 5-19, paragraph numbered 2.a. and 2.b. under the 'Water Quality' heading, should be stricken. See our comments regarding this subject matter on page 5-2."

Commenter 74

Response Items 2a and 2b in the FES Chapter 5 Summary Table have been deleted.

67. Comment "Page 5-19, paragraphs numbered l.b. and l.c. are examples of impacts which are not necessarily adverse but are merely changes."

Commenter 74

Response Paragraphs lb and lc have been deleted from the Chapter 5 Summary Table in the FES.

68. Comment "A notable deletion from the entire report is the impact of the project on Aurora's river intake facilities. The Aurora South Platte intake was conceived and constructed as a 'temporary' structure. Completed in 1967, this low profile diversion dam was to be shortly replaced by Denver's Strontia Springs dam, which was at that time in the planning stage. The present dam provides no sedimentation and is subject to considerable operational problems because of sand and ice. Total blockage by ice and partial restrictions by sand in Aurora's Rampart Tunnels have already occurred because of the inadequacy of the intake structure. All three of the major alternatives would have an adverse impact on future Aurora diversion capabilities."

Commenter 171

Response As discussed in Description of the Project in Chapter 1 of this FES, a new Aurora intake structure is planned at the Strontia Springs Dam site. The Upstream Dam Minor Alternative and the Low Dam Minor Alternative would also provide a new diversion structure for Aurora. All three would represent a very positive impact on Aurora's operational diversion of water.

Aquatic Resources

1. Comment. "A-1 Paragraph 4 - Limiting the clearing of vegetation is not a 'benefit to aquatic life' rather a reduction of construction impacts."

Commenter 85

Response. The more sediment that is entered into a stream, the greater the loss of the aquatic life due primarily to suffocation. Limiting the clearing of vegetation resulting in low inflows of sediment in the stream is in mitigating measure 1 and is very beneficial to the aquatic life.

2. Comment. "Page 4-11, Aquatic Resources. I find this section terribly inadequate, vague, misleading, and deceptive. Nothing less than detailed plans are acceptable. Surely you do not believe that the people of this region will sit back and buy a pig in the poke. This is the implication in this section. It must be corrected."

Commenter 121

Response. This section of aquatic resources in the Effectiveness section of Chapter 4 of the FES has been rewritten. Guaranteed stream flows are essential for the stream to be highly productive.

3. Comment. "Page 3-34, lines 28-29: Documentation should be provided for the statement . . . ' . . .prey species (would be) attracted to the reservoir and treatment plant area.'"

Commenter 75

Response. Since these areas do not presently exist, it is a professional opinion that if attractive habitats would become established, the prey species would utilize them. Species normally seek the habitat most suitable to their needs.

4. Comment. Two respondents submitted comments similar to the following comment: "Page 2-37, third paragraph, last sentence. 'Detailed fish population data are not available for the North Fork.' This statement is true, however, the data should be available, is easily obtainable and therefore the responsibility of the BLM or other responsible agencies to provide. No EIS of this importance should be submitted in incomplete form. Is the public not entitled by law to know what we are to lose because of this project? Is the above a so-called cop-out? Because I find many statements of omissions as above, I sincerely wonder if this action is purposeful."

Commenters 121 and 221

Response. While detailed data were not available, enough data were known to generally describe the fisheries population. More complete data would be gathered before the channeling of the North Fork by the DWB would begin. The channelization is not a part of the Foothills Project but is project related.

5. Comment. "Obviously there is a self-sustaining self-reproducing brown trout population about the intake which has existed since their original introduction and data on their movement is a moot point. A dam and reservoir controlled and limited flow below the dam and above the reservoir will have severe negative impacts on these populations. Why not explicitly and succinctly say so?"

Commenter 121

Response. The brown trout are self-sustaining, but as stated their movements are debatable. A dam and reservoir will have negative impacts; the greatness of these impacts would depend upon the type and amount of releases. Water temperatures are critical to triggering spawning and feeding habits. Occasional flushing action could alter these habits severely depending on the length, amount, and time of year. Reservoir or impounded waters do create habitats favorable to suckers and other rough fish.

6. Comment. Two respondents submitted comments similar to the following comment: "Page 3-22, second paragraph. I know of no available data for estimating that the natural productivity of aquatic life in the 2.6 miles below the dam construction area will be reduced by ten to twenty percent during the construction period. How was this percentage arrived at? I suggest productivity may be reduced by ninety percent. Who is right and why?"

Commenters 121 and 221

Response. A change has been made in the Aquatic section of Chapter 3 of the FES. The 10 to 20 percent is the minimal figure of loss, and it could become 90 percent if mitigating measures are not followed to prevent excessive loads of sediment entering the stream. Fish production and recovery rate would also be dependent upon sediment control.

7. Comment. "Page 3-25, second paragraph. I do not agree with the fifth sentence that says aquatic vegetation in Dillon Reservoir is a menace to recreationists. By whose standards? I have heard no complaints. The very productivity of the reservoir depends on a lush littoral zone. It should be allowed to remain."

Commenter 121

Response. There is no impact on Dillon Reservoir at the 125 mgd development level; therefore, this discussion has been eliminated from the final document. There will be an unquantifiable impact at the 500 mgd development level, depending on which raw water concept is used. See Raw Water Alternatives in Chapter 8.

8. Comment. "3-65 Table 3-15 - Under aquatic resources number 1 - It is questionable that removal of 1 acre of aquatic habitat would result in the loss of 192 lbs. of trout."

Commenter 85

Response. This 192 pound loss is the loss of 64 pounds of trout per acre (Table 2-20) for the 3-year construction period when the acre of habitat would be out of production. A number is used to equate with the other numbers in Table 3-15.

9. Comment. "But the authors of the draft statement are not content with the use of $14,500,000 worth of Denver's water to compensate for the loss of a fishery estimated to weigh 567 pounds; the statement goes on in paragraph number 8 on page 4-3 to require that additional compensation be provided in the matter of developing stream improvements in a section of a stream which has been described in the Draft Statement as being a poor fishery to start with. No estimate of the cost of the proposed stream improvement program was made nor was there even a determination as to whether such a program would be feasible in view of the high flows of water which can normally be expected to be encountered in the stretch of the stream for which the program appears designed."

Commenter 74

Response. The bypassing of water and the improvement of streams are established mitigation measures common throughout the western United States for mitigating environmental damages occurring from water project equipment. It is assumed that the three-year construction period will allow sufficient time to develop a program to improve this particular stream below the dam down to Kassler Treatment Plant and that two years is ample time to implement the approved program. Chapter 4 in the FES has been expanded to better explain the program.

10. Comment. "Neither does it appear why the 'mitigating measure' described in the Draft Statement varies from the version recommended made by U.S. the Fish and Wildlife Service [sic] in 1977. . . . "How outrageously unreasonable such a requirement would be becomes obvious when it is understood that its imposition would force Denver to forego the diversion of as much as 9700 acre feet of water per year on some of the most senior Platte River water rights it owns. 9700 acre feet of water can supply 49,000 people with municipal water service and is

worth, at present market value, fourteen and one-half million dollars. . . . The final statement should recognize these facts and restore the natural flow concept in the treatment and description of fish flow bypass stipulations."

Commenter 74

Response. Text in the Mitigation Measures section of Chapter 4 in the final statement has been rewritten to reflect this change. The required flows are not to be released at the Strontia Springs Dam.

11. Comment. "Page 1-30, Para. 1: States stream will be dewatered during construction but does not say what time of year, for how long a period and what, if anything, will be done about the fish in the stream."

Commenter 69

Response. The text has been revised. See Chapter 1, Proposed Action section.

12. Comment. Two respondents submitted comments similar to the following comment: "'Existing diversion dams in the canyon do not seem detrimental to fish populations, but do curtail fish migrations.'

"The last phrase of this sentence is true, but the first part is false. I believe it is obvious that diversion dams are detrimental on the basis of their intended uses. Reduced water flows below the diversions, occasional release of sediments, encroachments of various types are directly responsible for reduced fish populations. In each case the original amount of fish habitat is reduced which is responsible for reduced fish populations."

Commenters 69 and 121

Response. The text has been revised. See Chapter 2, Aquatic Resources section.

13. Comment. "Page 3-22, Para. 2: Trying to estimate actual pounds loss is conjecture at best. Perhaps impacts on habitat would be better."

Commenter 69

Response. Text changes have been made. See Chapter 3, Aquatic Resources section.

14. Comment. "Page 4-3, #7: As previously stated, we are very concerned as to whether these flows of 30 and 60 c.f.s. can be maintained in this excellent fishery below the dam. This flow should

be guaranteed so it cannot be altered by water exchanges, etc. The last sentence, as stated, is bothersome."

Commenter 69

Response. This paragraph was rewritten in the final statement. See Chapter 4.

15. Comment. "Page 8-47, Aquatic Resources. The South Platte has to be extemely [sic] productive to remain largely self-sustaining considering location and fishing pressure."

Commenter 69

Response. The statement is very true. The South Platte is very productive and heavily fished. In the example, 300 fishermen were checked on 12 random days (in August 1973), and each fisherman spent an average of 4.35 hours fishing and caught approximately .9 fish per hour. This indicates heavy pressure from the public. Therefore, it is very necessary for the river to be extremely productive to remain largely self-sustaining (see Environmental Assessment DWB, 1973, for creel census, etc.).

16. Comment. "Page 2-37: The first sentence states that '. . . the river is still a highly productive sports fishery (Table 2-20).' Use of the term 'highly' indicates a subjective conclusion. It is suggested that this adjective either be dropped or the benchmark provided for concluding that 'highly' is the proper term. (The number of pounds of fish would be helpful here.)"

Commenter 74

Response. The text was revised in Chapter 2, Aquatic Resources.

17. Comment. "Page 2-37, Paragraph 4: As noted in this paragraph Ten Mile Creek has been completely rechanneled to accommodate construction of Interstate 70. The U.S. Forest Service and Colorado Division of Wildlife expect this total change of stream bed to increase the natural recruitment of trout into Dillon Reservoir. It seems incongrous [sic] and contradictory to state later within the EIS document that far less construction activity in the South Platte stream bed [sic] within the proposed Foothills project site will impact so negatively on the South Platte River and its fishery."

Commenter 74

Response. A completely new channel, including many and varied stream improvement structures, was constructed for Ten Mile Creek. This channel replaced a wide, shallow, and unproductive flood plain stream. The construction will be in the abandoned channel. The new stream will be much better than the degraded stream it replaces.

18. Comment. "Page 2-38, Table 2-20: This table has been completely misquoted; the wrong numbers have been used, the order of the numbers has been rearranged, there are major omissions, and the axis of the table has been switched. This table is inaccurately copied from the source quoted. Additionally, there have been alterations to the table which are not explained in the text. These changes were apparently made to give the original tables added credibility. Example: Table 2-20 appears in the source quoted as Table A-6 pg. A-15. In study Section 2,- Rainbow Trout - A zero (o) recapture of marked fish is noted. Therefore, no population estimates for that species could be made in that section. However, such a value is presented; but in the draft EIS no estimate is shown. The table must be corrected or deleted."

Commenter 74

Response. Table 2-20 in the Aquatic section of Chapter 2 was corrected in the final statement. See Chapter 2 of the final statement.

19. Comment. Two respondents submitted comments similar to the following comment: "Page 2-39, Table 2-21: The number of fish per acre for the lower South Platte River is not 35 at 2 lbs. The number should be 374 at .17 lbs. for a total pounds of fish per acre of 64."

Commenters 74 and 85

Response. Text changes were made in Table 2-21 in the Aquatic section of Chapter 2 in the final statement. The correct figures are 350 pounds at .2 pounds for a total of 71.3 pounds of fish per acre.

20. Comment. "Page 3-24, last paragraph: This paragraph which concludes at the top of page 3-25 provides the reader with the wrong impression. This should be rewritten to make it clear that the effect of any drawdown in Dillon on the fish population is negligible as is implied at the top of page 3-25 and as confirmed by Mr. Boaze in his testimony on August 11, 1977. Since this effect is speculative and negligible, this paragraph really should be eliminated from the final statement."

Commenter 74

Response. This paragraph was deleted from the FES. There are other discussions of Dillon Reservoir located in the various raw water concepts in Chapter 8 of the FES.

21. Comment. "Page 3-57, Last Paragraph: This paragraph assumes no stocking program for sport fish would be undertaken and this assumption must be noted. . . . This paragraph has an unstated assumption that those agencies responsible for providing fishing opportunities will not carry out their responsibilities by stocking the reservoir. This assumption should be stated. Further, see our discussion of page 4-1, mitigating measure 7."

Commenter 74

Response. This paragraph was rewritten in the Aquatic section and Recreation section of Chapter 2 in the FES. It is probable that no fishing will be allowed in Strontia Springs Dam.

22. Comment. "Page 3-65, under the heading 'Impact of 125 mgd,' paragraph numbered 3: A phrase should be added at the end of this sentence as follows: '. . . unless a stocking program is initiated.'"

Commenter 74

Response. No change is needed because this increase of biomass would be non-game. Even if a stocking program were initiated, the put and take fish would be short-lived and would not become a productive population, but the alteration of the environment would induce non-game species production.

23. Comment. "Page 3-71, under the heading 'Impact of 125 mgd,' paragraph numbered 6: This assertion assumes that the reservoir will not be managed for fishing and that it will not be stocked. It is suggested that it be rephrased as follows:

> 'Management of the reservoir will determine
> its fishing quality.'"

Commenter 74

Response. The text was revised to indicate the loss of 1.7 miles of stream fishing. See the Summary table in Chapter 3 of this FES.

24. Comment. "Mitigating measure No. 7 on page 4-3 indicates that the BLM plans to require Denver to bypass certain flows of water at the Strontia Springs Dam Site. The stated reason for this requirement appears to be for the purpose of compensatting [sic] for the conversion of 1.7 miles of free-flowing stream to reservoir use.

"Nothing appears in the Draft Statement to explain whether the Strontia Springs stream flow bypass stipulations agreed upon by the United States Fish and Wildlife Service and Denver in 1967

(Attachment 11A) have become obsolete by reason of any changes in the natural conditions on the stream."

Commenter 74

Response. The agreed upon stipulations would not become obsolete. This mitigating measure is for this site only and is a requirement by the BLM and USFS; therefore no mention is made of the USFWS and Denver agreement. No new changes would be made.

25. Comment. "Page 5-5, Paragraph 4 which continues on page 5-7 should be revised to reflect that the 25-acre loss of riparian habitat referred to in this paragraph may be excessive and if it does occur in that magnitude, it would occur over many, many years. Therefore, the establishment of riparian habitat around the shoreline of the reservoir would, over these same years, actually amount to a net increase in riparian habitat."

Commenter 74

Response. The paragraph has remained as written because of the type of reservoir; riparian vegetation will never have the production it has now. The fluctuating water level and slope of the land at the water's edge are two major factors that prevent good riparian growth. Also, the 27 acre figure is well within reason, and the net loss is only 14 acres.

26. Comment. "Page 5-20, paragraph numbered 1., under the 'Environmental Elements of Aquatic Resources,' 'Impacts at 500 mgd,' needs revision to demonstrate the time period over which this possible impact may occur. Use of the word 'destroy' is an example of inflammatory description of a questionable impact."

Commenter 74

Response. The paragraph has been deleted from this table in the FES, Chapter 5.

27. Comment. "4-3 Paragraph 1 - Bypasses for fish flows should read 60 CFS May 15 to September 15, 30 CFS September 16 to May 14, or the natural inflow whichever is less. The possibility of using stored water for fish flows under Colorado water law is questionable, and why should the DWB be given 'consideration' for this in future projects? Each project should be evaluated on its own merits."

Commenter 85

Response. The text has been rewritten to state natural inflow at Strontia Dam or the 60 cfs May 15 to September 15 and 30 cfs

September 16 to May 14. The last sentence in the paragraph was deleted. See Chapter 4, Measures section.

28. Comment. "2-43 Table 2-24 - Footnote number 2/ does not appear anywhere in the table."

Commenter 85

Response. Footnote 2 was removed from Table 2-24 in the FES.

29. Comment. "Page 3-22, under the heading 'Aquatic Resources': the discussion needs some revision. the statement assumes that there would be no stocking of this reservoir. This accounts for the low biomass of game fish. This assumption should be pointed out. Another observation with regard to the last paragraph is that since this entire area receives an extreme amount of fishing pressure to the point that it is in essence a 'put and take' stream, the statement should acknowledge that fact by referencing the language on page 2-33 and 2-37. Full disclosure of the degree of stocking which takes place in the subject area should be made.

"John Boaze, the task force member responsible for the preparation of the aquatic resources section, testified under oath on August 11 that the reservoir would support sport fish and it would be feasible to stock the reservoir and if that were done and access to the reservoir were provided that a higher poundage of sport fish could be taken from this 1.7 miles of stream than is taken from this stretch in its current state."

Commenter 74

Response. The Colorado DOW feels a final decision on a management plan should be delayed until more data are assembled. Even if the reservoir were stocked, it would be only put and take and would only be a small percent of total biomass. The habitat in a reservoir encourages a large growth of non-game fish which out-compete game fish. The game fish would be unable to reproduce in the reservoir. The self-sustaining population of brown trout would augment to a small percent the game fish population in the reservoir by downstream migration. Table 2-30 (Chapter 2) shows the stream is mostly a self-supporting stream and the put and take of rainbows are a small percentage of total biomass.

Geology, Minerals, and Topography

1. Comment. "Our primary objection to the DES is that a design earthquake is not selected. There is a general discussion of the Golden fault (pg. 2-46), the fault closest to the dam site which has documented Quaternary movement, but more specific information should be included (i.e. fault length, epicentral distance, maximum expected earthquake magnitude, and the resulting site response). Such information is essential to adequately design the dam for earthquake shaking. A second point of concern is the duration of microearthquake monitoring of the dam site (pg. 4-19). The proposed two-month preconstruction monitoring period should be increased to a minimum of six months."

Commenter 3

Response. The design earthquake selected by the Bureau of Reclamation had a maximum credible earthquake event of a 6 magnitude at an epicenter distance of 15 miles and a focal depth of 10 miles. Due to USGS input (Colorado Geological Survey), Harza Engineering reevaluated the dam site and determined that the dam will withstand a maximum credible earthquake of 7.4 magnitude at 5 miles without collapse.

The conditions of monitoring the dam site have been changed. Refer to the geology section in Chapter 4 for the changes.

2. Comment. "We are concerned about possible adverse impacts on mineral resources in the vicinity of the water treatment plant, where clays, coal, and limestone have been produced from numerous pits, mines, and quarries. According to the statement, the treatment facility would strongly influence the use of adjacent lands as well as the site itself. Without a detailed field investigation, we cannot determine whether this component of the proposed Foothills Project would, in effect, preclude recovery of mineral resources that otherwise might be produced. In particular, sequential use of mined lands, such as the proposed use of the limestone quarry in the SE¼sec. [sic] 2, T. 7 S., R. 69 W., for sludge disposal and subsequent reclamation, is desirable but only if no active or probable future mineral-production operation would be displaced and only after recoverable mineral resources have been extracted. This matter should be discussed in the final environmental statement."

Commenter 13

Response. The mineral potential of the site for the treatment plant was investigated. There are mineral values which would be lost, but based on current economics, these values are not of significant economic importance. See Geology, Minerals, and Topography section in Chapter 3 of the FES.

3. Comment. "3) The EIS does not indicate whether the spring at Strontia Springs will be included in the inundated area. If so:

"a) If the spring continues to produce water, would the traces of uranium found in it have any effect upon our water quality?

"b) If water from the reservoir instead backs up into the spring underground channel, what would be the geological effects? Would there be a significant loss of reservoir water? Could an earthquake result, as appears to have occurred a few years ago in the Denver region when waste materials were forced back into the earth."

Commenter 72

Response. Strontia Springs will be inundated. No abnormal traces of uranium have been found in the water of Strontia Springs; the anomalies which are found are of radium and radon concentrations. These concentrations are not found in large enough quantities to cause any water quality problems.

The earthquake potential and engineering techniques to prevent water seepage along faults and shear zones are discussed in Chapter 2. There will be no significant loss of water into the spring channel. The faults in Stevens Gulch (from which the springs issue) and other faults are discussed in this chapter under Geologic Hazards and Problem Areas.

4. Comment. "Page 5-21. under 'Geology, Minerals, and Topography,' paragraphs numbered 3. and 4. are insignificant impacts; they should not be in a table of this nature."

Commenter 74

Response. Although these impacts may presently be relatively minor, they are definite impacts which could become more significant over the life of the project.

5. Comment. "Page 5-21, under 'Geology, Minerals, and Topography,' paragraph numbered 5. is not stated as an adverse effect elsewhere in the text, it will serve to revitalize downstream fishery habitat."

Commenter 74

Response. The depositing of 54,400 tons of sediment in the reservoir is identified as an impact in Chapter 3, Geology, Minerals, and Topography section. The reduction in sediment below the dam is not an adverse impact; Table 5-6 (Chapter 5) has been revised accordingly.

6. Comment. "Page 5-21, under 'Geology, Minerals, and Topography,' paragraph numbered 6.: A use of a resource can hardly be termed adverse. This more properly belongs in Chapter 7, IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES."

Commenter 74

Response. This paragraph is included in Chapter 7, Geology, Minerals, and Topography. It has been deleted from Chapter 5, Table 5-6.

7. Comment. "Page 3-26, seventh paragraph. The wording of the first sentence is misleading to the point of favoring building of the Dam, Reservoir, and Access Road. There is little question that the access road will be highly detrimental to the now relatively natural stream bank. Is this paragraph purposely deceiving? Special attempts were made by me to inform the contractor of the importance of stream banks in running water ecosystems."

Commenter 121

Response. This paragraph has been expanded in the Geology, Minerals, and Topography section, Chapter 3, in the final statement.

Soils

1. Comment. "Deposition of waste as well as rehabilitation of disturbed sites should be handled on a site specific basis. A rehabilitation plan should be developed for each site disturbing project."

Commenter 55

Response. It is not necessary within the context of the ES process to specify exactly the rehabilitation techniques under mitigation measures in Chapter 4. Mitigation measures provide a framework of criteria to assure that optimum rehabilitation takes place.

2. Comment. "(3) The DEIS is not clear on the amount of increase in sediment from additional transmountain diversions being carried in the North Fork of the South Platte."

Commenter 42

Response. It is not known how raw water will be provided to the Foothills plant beyond 1988. The Raw Water Concepts presented in Chapter 8 are intended to array only three possibilities which include transmountain diversions; therefore no specific calculations on sediment yield may be made at the present time.

3. Comment. "(1) The data on the sedimentation in the Foothills Draft EIS is contradictory. The sediment yield figure of .15 acre feet per square mile per year (page 2-51) does not correlate to the stated silt storage capacity (page 3-2). Using the .15 yield rate (which the proponents obtained from the 1974 maps prepared by the Colorado Land Use Commisssion and the Soil Conservation Service), sediment would reach 100% of the reservoir's capacity in about 62 years, rather than the 27% (2110 AF) indicated in the DEIS."

Commenter 42

Response. The calculations provided in the DES were recalculated. The sediment storage capacity is 2,110 acre-feet. If .15 acre-feet per square mile is used as the sediment yield factor, 166 square miles as the effective sediment yielding drainage, and 75 years as the project life, then within 75 years the maximum sediment storage expected behind the dam would be 1,868 acre-feet. This assumes that 100 percent of all sediment entering the reservoir would be effectively trapped as planned, 1,868 acre-feet is 88 percent of the sediment storage capacity.

The Soil Conservation Service sediment yield map is considered to be the best available information to be used in making the above calculations.

4. Comment. "We invite your attention to a potential danger of using a general map to determine averages for project type work. The SCS sediment yield map used for the calculations states, 'It should not be used for design purposes at individual local sites.' (P2-51 second para.) We question, also, if the same method was used for the calculations in para. 5, P3-27."

Commenter 55

Response. The projection of sediment yields was based on the best information available and was felt adequate for the purposes of identifying impacts.

5. Comment. "Page 2-47, lines 20-21: Clarify '...natural productivity of the soil...' within context of this sentence."

Commenter 75

Response. The text has been revised. See Chapter 2, Soils section.

Terrestrial Resources

1. Comment. "Pages 2-56 and 2-58 - general: Why is vegetation and soil information included under 'Wildlife' heading? Also, why is this writeup excerpted verbatim from another study instead of described specifically for the study area?"

Commenter 75

Response. The inclusion of vegetation and soils information under the Wildlife section was used to clarify and to set the stage for the wildlife summarization because of the dependence of most wildlife species on specific vegetation communities. The use of existing data and its reference in this ES was designed to save time and money. It is felt that the existing information was sufficient to adequately cover the pertinent vegetation related subjects.

2. Comment. "I doubt whether either mitigation measures mentioned for the bighorn sheep would be viable. Where and how are they going to be transplanted and who will pay for it. Handling and stress certainly increases the incidence of disease and I doubt if they would survive after they were brought to the project area."

Commenter 57

Response. Handling and stress can cause problems, but if done properly these problems can be minimized. The handling and transportation of any wildlife would be controlled by the Colorado Division of Wildlife.

3. Comment. "Page 3-32, lines 32-36: Why are impacts to wildlife discussed under Vegetation heading when Wildlife heading follows immediately?"

Commenter 75

Response. The primary topic is vegetation, but it also includes a cause and effect relationship: If certain habitats are lost, dependent animals cannot survive. The Wildlife section is devoted primarily to nonvegetation type impacts which could result from construction.

4. Comment. "Page 3-33, lines 6-7: Documentation is needed for statement'. . . construction would result in little net loss of biomass.'"

Commenter 75

Response. Text changes were made in the final statement. See Chapter 3, Terrestrial Resources section under Vegetation.

5. Comment. "Page 3-34, lines 22-27: This discussion is extremely confusing and contradictory. First it is stated that golden eagles 'would probably' abandon existing eyries during construction and then, in the very next sentence, it is stated that since the eagles are used to 'people pressure' they 'would probably continue to use the existing nests.' Although the writeup would remain nebulous, the contradiction could be eliminated by substituting 'coulds' for the 'would probablys.'"

Commenter 75

Response. Situations such as this can only be discussed in a hypothetical manner based on the best available expertise. How wildlife (eagles) may react under certain circumstances is not completely predictable. The paragraph does attempt to discuss the possible reactions of the eagles to construction activity.

6. Comment. "The EIS's discussion of birds in the project area appears to be incomplete. An examination of bird lists from which this discussion may be derived indicates that the bird list, although it names 100 sets of species which are common, occasion or rare, it does not contain any data about birds specifically impacted by the project."

Commenter 131

Response. With birds, the main impact will be the flooding of riparian nesting vegetation (shrubs and deciduous trees) with a corresponding loss of habitat for such bird species as warblers, owls, doves, hummingbirds and vireos. There will be some trade-offs, however, in that waterbirds such as duck, geese, phalaropes, sandpipers, and grebes may increase and the increased shoreline may provide new feeding habitat for the Chatfield heron rookery. The value of the area will be increased if deciduous trees are allowed to remain around the shoreline as they become established.

7. Comment. Several respondents submitted comments similar to the following comment: "The projected desertion by Golden Eagles of the aerie could be mitigated presumably by limiting construction of the road and the project to a period other than the nesting season, i.e., other than March 1 to July 31. I wonder what supports the EIS assumption that the eagles would return to their aerie three to four years after deserting it because of construction activity? Similar comments apply to the Peregrine Falcon, the one endangered species within the project impact."

Commenters 131 and 207

Response. Because of updated information, subject statements related to golden eagle and peregrine falcon activities have been deleted in the final statement.

8. Comment. "The power lines planned as part of the Foothills project thus have the potential of being quite lethal of the falcons. This is not specifically mentioned in the impacts section of the EIS."

Commenter 207

Response. This final statement has a discussion of powerline impact on raptors on page 3-40, Chapter 3. Mitigation measure 20 on page 4-6, Chapter 4, of this final statement discusses what will be done to minimize this impact. On page 8-47, Chapter 8, of this final statement, a minor alternative is offered which would totally eliminate any impacts of the lines on the raptors.

9. Comment. "The EIS section on the golden eagle on the same page states that prety [sic] species for raptors will be attracted to the reservoir and treatment plant site. What species would be attracted and why is not explained in the EIS. If the reservoir area is to be abject to heavy recreational use, as the section on mitigation measures suggests, prey species may not return so easily as is suggested."

Commenter 207

Response. Text changes have been made. See Chapter 3, Terrestrial Resources section.

10. Comment. "Page 1-31. It is not practical to cut products in this area and sell them to the public due to the area's isolation, steep slopes, size of material, and low product values involved. To be marketed this material would have to be hauled out for the public's access."

Commenter 55

Response. The FES does not mention selling the products to the public. The specifics of how to handle the cutting and removal of the timber would be handled by a timber permit from the agencies involved.

11. Comment. Two respondents submitted comments similar to the following comment: "No mention is made as to the effect on the bald eagles. They also are protected."

Commenters 31 and 37

Response. Little is known of the use of the area by southern bald eagles which nest along the South Fork. Since they have not been observed in the project area, it is assumed that they do not frequent that portion of the river.

12. Comment. "Page 2-62, lines 20-22: What 'official list of plant species protected by Endangered Species Act?' As stated in Chapter 8 (page 8-52) the Federal Register lists only proposed endangered plant species for Colorado and the State has not published a list of endangered plants. When and by whom was Waterton Canyon surveyed for endangered plants? The statement 'No known threatened plant (sic) species occur in the area' indicates that such a survey was made!"

Commenter 75

Response. The Federal Register list was reviewed as to known location of proposed endangered plants. The closest proposed endangered plants were at the 10,000 foot level of Park County. In addition, on June 16, 1976, the Colorado State University Computer Center was contacted regarding the species listed in the Federal Register and the species listed as endangered in Colorado. Computer runs were made for Park, Jefferson, and Douglas Counties which confirmed listings. Text changes have been made in the final statement. See Chapter 2, Terrestrial Resources section, Endangered Species subheading.

13. Comment. "The Impact Statement makes no recommendation or anything as to how you are going to stop similar poaching during the construction of the dam at Strontia Springs and the tunnel and all the rest of it."

Commenter 162

Response. The probable methods for prevention of poaching have been advanced. Two methods are included in the Proposed Action: (1) Bus all workers in and out of the construction area, and (2) Employ guards at the entrance gate who will limit access to only authorized personnel.

State and federal laws and regulations permit ingress and egress of DOW enforcement personnel. The presence of these law enforcement agencies will help insure proper wildlife management.

14. Comment. "I do not think that a preliminary study 'To monitor the effects of human activity on the 60-65 head of Bighorn Sheep during the three year construction period in Waterton Canyon' is necessary. Past experience with construction in the same Canyon showed that the Sheep would be adversely affected.

"Therefore if construction is approved better that the Denver Water Board and the Denver taxpayers money be used for the following mitigation.

"1. Finanace the trapping and transplanting of the Bighorn in the Canyon for movement to another area.

"2. Upon completion of the project, finance a study for return of the Bighorn to the Canyon. This will be to implement any remnant herd or re-establish a viable herd there. This study should include the adverse effects that the noise from the Dam and water gravity flow would have on the Bighorns.

"3. Finance the trapping and transplanting of Bighorn Sheep for return to the Canyon at completion of the dam."

Commenter 163

Response. Unfortunately, past experience with construction does not delineate the actual adverse impacts on the sheep that appear to have caused a decline in sheep numbers during the last construction period. There are several assumptions, some of which appear to be valid, but these data necessary to substantiate any conclusions are missing. This monitoring program must be accomplished as a scientific study, as casual counts or observations would not supply the missing information. The study will give the data needed for this project and will also furnish valuable information that can be used during similar situations. The study will also furnish information on bighorn sheep management in general.

Trapping and transplanting the sheep would be rather difficult and costly. Those that come down to the road could be trapped rather easily; others that remain in the more rugged terrain would have to be baited, trapped and transplanted (probably airlifted) to a new area. Some sheep may be killed or injured.

Since it is not known how the sheep may react to or be affected by the construction activity, prudence dictates a cautious approach to the trapping proposal. All factors must be weighed as the cost and effort to trap, transplant and return the sheep may not be feasible and have greater impacts than a possible temporary displacement of some animals during the construction period. The suggestions for protecting the sheep will not be dismissed from future consideration because an irreversible decision has not been reached. Should monitoring show removal is necessary, it could be done at that time. As of now, it is the general consensus of knowledgable wildlife personnel that the adverse impacts of construction activity would not justify the trapping and transplanting operation. Some sheep, those that frequent the construction area, may have to be removed.

Safeguards to eliminate possible loss from poaching will be included which were not included during the last construction. Who pays the costs must be resolved before construction is started.

15. Comment. "We find no discussion for mitigating terrestrial wildlife losses via acquisition of replacement habitats. This approach should certaily be considered in the final environmental statement."

Commenter 85

Response. The actual loss of terrestrial habitat on public lands would be relatively minor; therefore no discussion is offered for this particular method of mitigation.

16. Comment. "3-33 Paragraph 4 - The impact of constant harassment and noise associated with construction will have deleterious effects on virtually all wildlife not just Bighorn sheep."

Commenter 85

Response. Noise could also affect other wildlife, but the sheep are restricted in movement by limited habitat. Because numbers are few and habitat limited, the bighorns are given preferential consideration.

17. Comment. "Page 5-5, Paragraph 3: the conclusion of this paragraph is an overestimate of the adverse effect. Of the 108 acres of vegetation that will be permanently lost, 95 of the acres would be under water in the reservoir take zone. Since the reservoir is projected to be of high quality and since there will be a significant reduction in the sediment load of the water passing through the dam, it seem [sic] to be a drastic overstatement to state that the additional 13 acres of vegetation permanently lost out of the thousands of acres in the Canyon 'would significantly affect terrestrial habitats, sediment yields, and water quality.'"

Commenter 74

Response. The text has been rewritten in the FES, Chapter 5, Terrestrial Resources section.

18. Comment. "Page 5-7, first full paragraph, (paragraph 1): Speculation and possibilities of impacts described elsewhere in the texts are transformed into certainties in Chapter 5. For example, it has not been established that there will be illegal killings of wildlife. It would be more correct to replace the first sentence with the following: 'Adverse impacts on wildlife species in the project area will vary.'"

Commenter 74

Response. Text has been revised. See Chapter 5, Terrestrial Resources.

19. Comment. "Page 5-7, Paragraph 3: This paragraph should be stricken. Such impact on the North Fork is not quantifying and is not part of this process, rather it relates to future Corps of Engineers actions. Secondly, with regard to any impact on the American peregrine falcon, there is no adverse impact. See our discussion of page 3-34."

Commenter 74

Response. The paragraph has been deleted in Chapter 5, Terrestrial Resources section, of the FES.

20. Comment. "Page 3-34, under the heading 'Southern Bald Eagle': In a deposition taken on the 15th day of August, 1977, Mr. William C. White stated that generally the Southern Bald Eagle inhabited a geographic area south of the proposed project area and further that in the discussions which took place among experts and interested parties regarding the endangered species, American Peregrine Falcon, no concern was raised and no discussion was had regarding the Southern Bald Eagle. Therefore, the final statement should be corrected in accordance with this opinion. See Attachment 9E."

Commenter 74

Response. This change has been made in the final statement. See Chapter 3, Terrestrial Resources section.

21. Comment. "Page 3-34, under the heading 'Deer and Other Big Game': The second sentence in the first paragraph therein which states 'Also, illegal killing of these animals would take place.' is an unsubstantiated assertion."

Commenter 74

Response. Text changes have been made in the final statement. See Chapter 3, Terrestrial Resources section.

22. Comment. "Page 3-68, under the heading 'Impact of 125 mgd,' paragraph numbered 2.b.: This reference to impact on endangered species needs to be corrected in accordance with the new information available, referenced hereinabove. It is suggested that this paragraph read as follows:

> 'Peregrine falcon. No adverse impact on this species is expected.'"

Commenter 74

Response. This change has been made in the final statement. See Table 3-16, Summary section in Chapter 3 of the FES.

23. Comment. "Page 3-68, under the heading 'Impact of 125 mgd,' paragraph numbered 2.c.: This paragraph overestimates the negative impacts. The statement regarding the golden eagle eyrie is not substantiated in the text. Conjecture in the text is transformed to absolute statements in this table."

Commenter 74

Response. This change has been made in the final statement. See Table 3-16, Summary section of Chapter 3 of the FES.

24. Comment. "Page 3-71, under the heading 'Impact of 125 mgd,' paragraphs numbered 1 and 3: These paragraphs need to be corrected, especially as they relate to Bighorn sheep."

Commenter 74

Response. Text changes have been made in the final statement. See Table 3-16, Summary section of Chapter 3 of the FES.

25. Comment. "Page 5-7, Paragraph 2: This paragraph regarding the adverse impacts on the Bighorn sheep population must be revised in accordance with our discussion of the Summary page."

Commenter 74

Response. The text has been revised in the final statement. See Chapter 5, Terrestrial Resources section.

26. Comment. "Page 7-1, Last Paragraph: The third sentence should be deleted in accordance with our discussion of the American peregrin [sic] falcon relative to page 3-34."

Commenter 74

Response. Text changes have been made in Chapter 7 of the FES, Terrestrial Resources section.

27. Comment. Several respondents submitted comments similar to the following comment: "Page 2-62: Under the section entitled Endangered Species, the first sentence should be rewritten to clarify and update. There is no real evidence that the Peregrine Falcon or the Southern Bald Eagle 'inhabit the project area.' By combining this language with 'remote possibilities', it is impossible to tell exactly what species are in the project area. The U.S. Fish and Wildlife letter of 5 Aug. 77 should be referenced so that the public is aware of BLM's compliance with the Endangered Species Act. This will also provide the public with assurance that no endangered species or habitat will be disturbed by the proposed Foothills project. This section should be further clarified by deleting the sentence regarding the northern

race of the bald eagle proposed for the endangered list. Additionally, no documented black-footed ferret sightings have been made in this area."

Commenters 74, 75, 93, and 209

Response. The text was revised in Chapter 2, Terrestrial Resources section. Appendix 3 was appropriately updated in the FES.

28. Comment. Several respondents submitted comments similar to the following comment: "Page 2-60: The section entitled Bighorn Sheep is deficient and in error. The erroneous statements and assumptions contained in this section are magnified in the Bighorn Sheep discussion in chapter 3 on page 3-33 which leads to the drastic overestimate of the adverse impact on the Bighorn Sheep."

Commenters 55, 65, 74, and 93

Response. It is felt that statements made in this ES relating to bighorn sheep are as accurate as possible. Different wild animals, even within the same species, may react differently to the same stimulant. For this reason, a definite statement of what would be the bighorn sheep population's reaction to the Proposed Action is impossible. All that can be done, before the actions take place, is to assume what would be the most probable result based on the available expertise and data.

29. Comment. "Page 5-22, under 'Terrestrial Resources,' paragraphs numbered a., b., and c. should be corrected in accordance with our comments regarding page 5-7."

Commenter 74

Response. Text changes have been made in Table 5-6, Summary section of Chapter 5, in this FES.

30. Comment. "3-32, Vegetation - Under this section the statement indicates a loss of riparian vegetation and goes on to say that impacts on wildlife species would not be significant. Given the tremendous yield (Pounds per Acre per Year) shown for riparian vegetation on Table 2-26 this seems inconsistent."

Commenter 85

Response. Text changes have been made under Terrestrial Resources in Chapter 3 of this FES.

31. Comment. "Page 5-21, under 'Terrestrial Resources,' paragraph numbered 1. should be corrected in accordance with our comments regarding page 5-5."

Commenter 74

Response. Table 5-6 in the Summary section of Chapter 5 has been revised in the final statement.

32. Comment. "Page 3-34, under the heading 'Golden Eagle': Mr. Boaze testified on August 11 that his research regarding the distance of the nests from the proposed construction activity led him to conclude that there would be little impact and therefore no special mitigating measures would be necessary to protect the nesting golden eagles."

Commenter 74

Response. Text changes have been made in Chapter 3, Terrestrial Resources section, of the final statement.

Climate and Air Quality

1. Comment. Several respondents submitted comments similar to the following comment: "Point Five: The DES contains false statements regarding present and future air quality in the Denver Region. The DES cites a 1974 EPA study which concluded that by 1981 carbon monoxide emissions would be reduced to acceptable levels, and that by 1986 total vehicle emissions of hydrocarbons would be reduced to limits allowable for human environments. However, the EPA study is outdated and has been superceded [sic] by several more recent studies which were available when the DES was being prepared."

Commenters 69, 70, 79, 129, and 136

Response. Appropriate text changes have been made throughout the final statement to include data from more recent studies. References to the 1974 study have been eliminated and air quality is discussed only for the project area.

2. Comment. "Page 3-35. The DES contains a false statement that the: 'Use of construction vehicles would result in emissions. However, the Clean Air Act of 1970 requires emission control devices on all new vehicles, including construction vehicles.' (p. 3-35). Emission control devices are currently required only on 'light-duty' vehicles and engines, which do not include most construction vehicles (42 U.S.C. 1857f-1). Emission reduction devices will not be required on construction vehicles until model year 1979 (Section 224, Clean Air Act Amendments of 1977)."

Commenter 69

Response. The statement was eliminated from the final statement.

3. Comment. Two respondents submitted comments similar to the following comment: "The catastrophe which could result from spillage of toxic materials at the treatment plant during an inversion must require specific regulations and precautions concerning the time of day and year such chemicals can be transported and loaded."

Commenters 69 and 72

Response. Potential impacts of spillage are detailed in Chapters 3 and 5 in the Climate and Air Quality section.

4. Comment. Several respondents submitted comments similar to the following comment: "Therefore the BLM is required to demonstrate that the proposed action is in conformance with the State's Air Quality

Implementation Plan (SIP). The Final Environmental Statement must address the consistency of the proposed action with the SIP."

Commenters 69, 74, and 136

Response. The SIP is outdated and inconsistent with the DRCOG population forecast. It is presently being updated by the State's Air Pollution Control Division to the DRCOG forecast. The text in Chapter 1 under Governmental Actions and Chapter 3 under Climate and Air Quality has been revised per communications with the State's Air Pollution Control Division, the agency responsible for preparation of the SIP.

5. Comment. Two respondents submitted comments similar to the following comment: "The consideration and analysis of the impact of the Foothills Project on air quality in the Denver Metropolitan Region is grossly inadequate. The exclusion of the secondary impacts of Foothills on air quality is unacceptable. In addition, the DES contains several false statements regarding present and future air quality in the regions."

Commenters 69 and 72

Response. Appropriate text changes have been made throughout the final statement to correct the fallacies. The primary and secondary impacts of this site-specific ES are detailed under the Air Quality headings in various chapters throughout the text. The assumption in this ES is that the project will not induce growth and, therefore, the statement does not discuss the air pollution potential of that induced growth.

6. Comment. "Page 3-36. The section on Climate does not address cyclical and long-term climate change."

Commenter 69

Response. No discussion on long-term climatology is offered since no apparent impacts may be determined from the implementation of the proposal.

7. Comment. "Securing the necessary air pollution emission permits is a Department of Health authorizing action which should be (and was not) included in Table 1-3 'Summary of Authorizing Actions'. Since the project lies in a Commission designated air pollution control area, all fugitive dust permit provisions apply."

Commenter 69

Response. Appropriate changes have been made in the final statement. See Chapter 1, Table 1-3.

8. Comment. "The important consideration of the impact on the Air Quality of the metro Denver area for the projected growth figures appears to have been overlooked."

Commenter 217

Response. This site specific project-oriented ES was not considered to be the place for long range projections of the growth of the Denver metro area's infrastructure. See assumption 7 in Chapter 3 of the final statement.

9. Comment. "In addition, this Section should point out that without the Project, under reduced treated water supply with the attendant [sic] loss of horticulture and return to a semi-arrid [sic] landscape, there would have to occur a marked increase in air-borne particulate matter and fugitive dust."

Commenter 74

Response. The text has been changed in Air Quality subsection of the Future Environment Without the Project in Chapter 2 and Air Quality section of the No Action Alternative in Chapter 8 of this FES to depict that an attendant loss of horticulture would create a marked increase in fugitive dust.

10. Comment. "Page 3-69, under the heading 'Impact of 125 mgd,' and under the heading 'Impact of 500 mgd': New numbered paragraphs -- 3. -- should be added under the 'Environmental Element' of 'Climate and Air Quality' which state as follows:

> 'The proposal is consistent with the EPA approved State Implementation Plan.'"

Commenter 74

Response. Text changes were made in the Climate and Air Quality section of Chapters 2 and 3 detailing more clearly the relationship between this project ES and the site implementation plan.

Noise

1. Comment. Two respondents submitted comments similar to the following comment: "Noise levels are not analysed [sic] in relation to ambient noise standards of the State Health Department. It is believed that the noise of the water passing over the dam and through the various project facilities willhave [sic] a significant impact on wildlife and homeowners alike for distances as great as five miles."

Commenters 42 and 69

Response. During the construction period, noise levels will on an intermittent basis surpass State ambient noise standards; however, in normal operation, both the dam and the treatment plant will be far below state ambient noise standards. This information was derived from the environmental assessment done by the Denver Water Board and is considered to be the best information available. See Chapter 3, Noise section.

Visual Resources

1. Comment. "Page 5-9: At the beginning of the section outlined 'VISUAL RESOURCES: [sic] it should be pointed out that documentation or quantification of visual impact is subjective and is a function of distance from the impact and the object. The significance of impact as a function of distance applies to all such visual impacts and makes them impossible to quantify in other than general subjective terms."

Commenter 74

Response. Explanatory appendix on BLM Visual Resource Management has been added. As the appendix indicates, it is possible to quantify visual impacts in more than general subjective terms.

2. Comment. "A second area in which the DES falls short is in the evaluation of the loss of the narrow rocky section of Waterton Canyon. 'Inundation in the Waterton Canyon behind the Strontia Springs Dam would radically change the landscape. . .although this would constitute a radical change, the resulting landscape would also be pleasing to the eye'. (DES 3-42). The fact is that not only in the inundated area, but also in the shunted creek bed below, an exceptional mountain river, easily accessible to the common man in Denver, would be destroyed."

Commenter 47

Response. The visual impact analysis of the inundation of a 1.7 mile section of the South Platte River is limited to impacts that can be perceived by the human eye. From that standpoint, the description of the impact is accurate. It would be a radical change in the existing landscape; however, it would also be pleasing to the eye (as is the existing landscape). The ease of access to the South Platte River in this area and the human use that such access implies has little to do with the assessment of the visual effect of the altered landscape.

3. Comment. "The construction of aerial power and telephone lines is indicated. The report later points out that this has substantial adverse visual impact. Aerial lines may be satisfactory on a temporary basis, however, permanent installations should go underground. Forest policy is to bury all telephone lines and powerlines under 32 KV unless there are extenuating circumstances. This is especially important in areas where recreation and aesthetics are key values and public use is very diversified and intense. A recommendation for burial was conveyed from the Forest Service to the BLM on September 27, 1974, in our review and analysis of the proposed Foothills project."

Commenter 55

Response. Chapter 3 assesses the impacts of this part of the proposal. In Chapter 4 of this final statement, mitigation measures (numbers 20, 21, 22, and 23) are given which partially reduce the impact of the aerial lines. A minor alternative is offered in Chapter 8 of the final statement which describes the underground placement of these powerlines and telephone lines.

4. Comment. "On page 2-72 it is stated about the North Fork area, 'Past and present human use and occupation in this area has resulted in numerous encroachments on the natural landscape. As shown in Figure 2-3, these encroachments include roads, bridges, fences, buildings, power lines, and other indications of human use and occupation. Due to the extent of the existing human alterations in this area, it is not considered highly sensitive to change.'

"I take exception to what I think this statement implies! It may be less sensitive to more change of the same kind as is already there, but I think it--and the people who live there or use it for recreation--would be highly sensitive to the kind of complete change which the construction of a dam in that area would cause, and to the increased flows which might be eliminating the recreational use of the North Fork."

Commenter 66

Response. The phrase "sensitivity to change" refers to changes to the natural landscape features as they relate to the existing landscape. The sensitivity level (high, moderate, low) establishes a maximum acceptable level of contrast that a proposed action may have with the existing landscape. The features of the proposed action are then analyzed to determine their contrast with the existing landscape.

The North Fork of the South Platte River and Waterton Canyon do not meet the criteria established by the BLM for "high" sensitivity. The majority of the area does meet the criteria for "moderate" sensitivity and a small portion is rated "low" due to a low level of human use. As shown in the visual portions of Chapters 3 and 4, this does not allow uncontrolled and drastic changes to the existing landscape. See Appendix 4 (new addition) for an explanation of the procedures.

5. Comment. "The visual resources offered by Waterton Canyon and the North and South Forks of the South Platte are underestimated. On pg. 2-72 of the EIS."

Commenter 68

Response. The analysis of the visual resources in the proposed project area was made according to accepted BLM methods. The analysis was reviewed by a landscape architect and found to be accurate in his professional opinion.

6. Comment. " Page 2-72, Paragraph 3: The last sentence in this paragraph is deceiving. It should be amended to read, '. . . low contrast values indicate that the visual impact of the proposed action will be relatively low whereas high contrast values indicate that the visual impact will be relatively high. Both of these contrast values reflect a judgment on the part of the person establishing the contrast values.'"

Commenter 74

Response. The statement made in the DES was accurate in its present form. An explanatory appendix on BLM Visual Resource Management has been added. Making a judgment in determining contrast values is unavoidable. However, the BLM Visual Resource Management System is designed in a manner that minimizes the subjectivity involved in defining anticipated impacts. Also, these contrast ratings are reviewed by landscape architects for accuracy and consistency. Therefore, the ratings are not the reflection of only one man's judgment.

7. Comment. "Page 3-41, last paragraph: Since visual impacts are a subjective quantification, the last paragraph should be rewritten to read as follows: 'One method of measuring a visual impact of a proposal on an area is to measure the proposal's relative contrast with the existing landscape. Contrast would vary with the specific elements of the proposal, the specific locations of those elements, and the existing landscape as described by physical attributes.'"

Commenter 74

Response. An explanatory appendix on BLM Visual Resource Management has been added. As the appendix indicates, it is possible to quantify visual impacts in more than general subjective terms.

8. Comment. "Page 3-42, Paragraph 1: This discussion should be greatly expanded to include a discussion and explanation of the formula used to derive the visual management classes. This discussion should include a discussion of the 4 classes, and also a discussion of the symbols used on maps 2-8 through 2-11. Such corrections will clarify the current confusing nature of the paragraph. Finally, the method for arriving at the specific numbers listed in table 3-12 and 3-13 on pages 3-43 and 3-44 should be itemized. In that regard, a detailed discussion of 'sensitivity' should also occur. It should be emphasized that sensitivity in essense [sic] is a function of the number of eyes which may see a change."

Commenter 74

Response. An explanatory appendix on BLM Visual Resource Management has been added. As the appendix indicates, sensitivity is determined by several criteria. Only one of these is a function of the number of eyes which may see a change.

9. Comment. "Page 3-43: Under the column entitled 'Visual Management Class Maximum Contrast Limit' the number 20 should be substituted for the number 24 which appears in that column."

Commenter 74

Response. The allowable contrast is greater in the short term than in the long term. These numbers are accurate since they are in reference to the short-term impacts.

10. Comment. "Page 3-44, Table 3-13: The entire chart should have a notation, a caveat if you will, to the reader which reflects the fact that any attempt to categorize the anticipated visual impacts in the year 2001 is highly speculative at best. It is dependent upon an almost unlimited number of variables."

Commenter 74

Response. Anticipated impacts at the year 2001 A.D. must involve some speculation. This need not be repeated each time that the anticipated impacts are discussed.

The anticipated impacts, however, are not entirely speculative. An appendix has been added that explains the BLM Visual Resource Management System. This system includes anticipated recovery of disturbed areas with the passage of time when long-term visual contrast is assessed for a proposed action.

11. Comment. "Page 3-45: Figures 3-6 and 3-7 are misleading and confusing. Figure 3-6 can easily give the impression that high flows in the North Fork which are attributable to Roberts Tunnel diversions are causing the bank subsidence as pictured. There is no basis for this conclusion; therefore, it is suggested that this figure be removed in the final statement."

Commenter 74

Response. The figures have been deleted from the Visual Resources section of Chapter 3 in this FES.

12. Comment. "Figure 3-7 is also confusing because it is so obscured by the markings which attempt to delineate the existing river channel and flooding areas. If the object is to detect temporary flooding then actual pictures of such an event should be used along with an explanation of the cause. However, it is suggested that figures 3-6,

3-7 and 3-8 be omitted because of their basic irrelevance to this section."

Commenter 74

Response. The figures have been deleted from Chapter 3.

13. Comment. "Page 3-46: The first full sentence at the top of the page discusses photographic variety. This sentence should be deleted since photographic variety is not explained anywhere else in the statement."

Commenter 74

Response. The FES has been revised in Chapter 3, Visual Resources section.

14. Comment. "Page 3-47, Figure 3-9: An explanation of the effect of the snow which covers the physical characteristics of the landscape in this picture should be provided."

Commenter 74

Response. Each season has its own ephemeral qualities. It is impossible to take a photograph that does not have some of these qualities.

15. Comment. "Page 3-48, Paragraph 2: This paragraph is misleading. The paragraph attempts to explain that the impact of the Strontia Springs Dam would generate a large visual contrast. The last sentence in that paragraph must be deleted and substituted with a sentence explaining that the Dam is only visable [sic] in the canyon for approximately two-tenths of a mile. Viewing distances of the dam crest road in the staging area should also be mentioned in their respective sections so that the short distance that these visual impacts have will be put in perspective. Substantial testimony at the public hearing demonstrates that many received the wrong impression after reading the draft statement. In reality, a visitor to the canyon will not perceive the structure for much of the length of the canyon."

Commenter 74

Response. Cursory examination of Map 2-11 clearly shows that the dam would not be visible for the majority of the canyon's length. No change is needed.

16. Comment. "Page 3-48, Paragraph 3: This description of the dam crest road is also misleading. This paragraph in combination with Figure 3-11 which appears on page 3-50 overestimates the visual impact

of this road. It is suggested therefore that page 3-50 be corrected so that only the arrow be utilized to signify the point at which the proposed dam crest road traverses the mountain and a second picture of a similar road from another location be added so that the reader will have the correct impression."

Commenter 74

Response. Figure 3-11 accurately portrays the route of the Dam Crest Road, based solely on information supplied by the Denver Water Board.

The subject paragraph is accurate and does not overestimate the anticipated impacts according to the BLM Visual Resource Management System.

17. Comment. "Page 3-52, Figure 3-15: This figure is very deceiving in its current form. For example, the greater the distance from the viewer the more pronounced the lines appear on the picture. If the impact of the telephone poles on the canyon is to be accurately represented, it is suggested that actual photographs of telephone poles in a similar setting be provided along side of a picture of the canyon area without the benefit of the distorting impact of telephone poles and lines being placed on the photograph with heavy black drawings. Perhaps actual pictures of telephone poles such as those found on page 2-73 could be superimposed on a picture of the canyon to provide the viewer a more accurate impression."

Commenter 74

Response. The figure has been redrafted to more accurately portray the anticipated impacts.

18. Comment. "Page 3-53, under the heading 'Power and Telephone Lines': First, the impact of the power and telephone lines are greatly exaggerated. Secondly, the description is misleading. In addition to electricity and telephone service, these 'lines' will provide communication, remote control, and monitoring services. See our discussion of page 4-1. It is suggested that this heading be changed to 'Power, Telephone, and Remote Control Lines.' Although structure and linear characteristics would represent some contrast, the contrast would not be nearly as sharp as that represented by Figure 3-15 which is incorporated into the narrative on page 3-53. Additionally, it should be mentioned that the canyon already contains power pole fixtures from the earlier period associated with the old historic railroad grade."

Commenter 74

Response. Little remains of the powerline associated with the old railroad grade. It cannot be considered a significant factor in this situation. The impacts of the powerlines and telephone lines have been accurately assessed under the BLM system of assessment of visual impacts.

19. Comment "Page 3-58, Paragraph 1: The first sentence should be corrected to reflect that only a portion of the canyon would be utilized by the reservoir and from the remainder of the canyon the dam could not be viewed."

Commenter 74

Response. The text has been revised. See Visual Resources section of Chapter 3 in the FES.

20. Comment. "Page 3-70, under the heading 'Impact of 125 mgd,' paragraph numbered 6: The impact from power and telephone lines is overstated. It is suggested that the impact be rephrased as follows:

'Power and Telephone Lines:

noticeable linear impacts.'"

Commenter 74

Response. Noticeable linear impacts would understate the impacts of a structure that would generate a visual contrast of 22 points (2 points over the highest contrast allowed under the BLM system in any situation).

21. Comment. "Page 5-9: The last partial paragraph which concludes on page 5-10 and the first full paragraph on page 5-10 should be eliminated from the text because it is stated elsewhere that the draw down of Dillon can occur notwithstanding the proposed Foothills Project. Its inclusion in Chapter 5 provides the confusing impression that it is in some way related to the project."

Commenter 74

Response. The text has been changed. See Chapter 5, Visual Resources section.

22. Comment. "Page 5-10: Under the heading 'Strontia Springs Dam' the first paragraph should be rewritten to call attention to the reader that the Dam only becomes a dominate feature in the Canyon in that portion of the Canyon in which it is visible, estimated to be approximately 2/10's of one mile. Since the Dam is visible from only

a portion of Waterton Canyon, an inference that it dominates the entirety of the Canyon should be removed."

Commenter 74

Response. The paragraph is accurate. Cursory examination of Map 2-11 clearly shows that the dam would not be visible for the majority of the canyon's length.

23. Comment. "Secondly, this sub-section should point out that since quantification of visual impact is subjective, some individuals obtain pleasure by viewing the existence of a dam within a canyon. As a result, to some members of the public the change will be most positive."

Commenter 74

Response. In the Visual Resources section of Chapter 5, the last paragraph about the Strontia Springs Dam states: "such a structure is both graceful and impressive." No change is needed since the statement already indicates the positive aspects of the proposed dam.

24. Comment. "Page 5-11: The discussion under the heading 'Dam Crest Road', the discussion again overestimates the visual impact. See our discussion of page 3-48."

Commenter 74

Response. The subject paragraph is accurate and does not overestimate the anticipated impacts according the the BLM Visual Resource Management System.

25. Comment. "Page 6-2, Paragraph 2: The third sentence seems to overestimate the relative rugged nature of the project area in light of the fact that diversion dams exist and government vehicles often traverse the area."

Commenter 74

Response. The text has been revised. See Chapter 6.

26. Comment. "Page 3-71, under the heading 'Impact of 125 mgd,' paragraph numbered 8: The first sentence is a subjective observation and should be corrected. It is suggested that it be changed as follows:

> 'Access road could decrease wildlife habitat and will change the aesthetic appearance.'"

Response. The paragraph in question is a summarization of the results of applying the BLM Visual Resource Management System to this particular element of the proposed action. It is consistent with all other discussion of visual and wildlife habitat discussions relating to the access road in Chapter 3.

27. Comment. "Page 5-24, under 'Visual Resources,' paragraph numbered 4. is not necesarily [sic] an adverse impact."

Commenter 74

Response. This part of Table 5-6 of the Summary section in Chapter 5 has been deleted in the final ES.

28. Comment. "Page 5-24, under 'Visual Resources,' paragraph numbered 8. contains an overstatement of an adverse impact. See our comments regarding page 5-12."

Commenter 74

Response. This part of Table 5-6 of the Summary section in Chapter 5 has been deleted in the final ES.

Cultural Resources

1. Comment. Two respondents submitted comments similar to the following comment: "It is our understanding that compliance with the environmental impact provisions of Section 102(2)(c) of the National Environmental Policy Act and regulations thereunder should include compliance with Section 106 of the National Historic Preservation Act of 1966, as amended. The Foothills project statement is not complete in that it does not contain evidence of full compliance with the National Historic Preservation Act."

Commenters 45 and 69

Response. Simultaneous compliance with these two acts is desirable "to the extent possible" but not required. See CEQ guidelines § 1500.9a. BLM began preparing a 106 statement in March 1977 in full coordination with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation. An effort is underway to complete the compliance process prior to the publication of the final environmental statement so that it can be included as an appendix to the document. Should BLM fail to meet the deadline, a full 106/2b documentation of effort will be provided prior to the beginning of the project.

2. Comment. Two respondents submitted comments similar to the following comment: "We disagree that the integrity of the Keystone Bridge would be 'lost either through removal, destruction, modification, etc.' The bridge is listed on the National Register of Historic Places as an object, not a site. It was not listed because of its historical significance in place on the old railroad bed. Moving the bridge would still retain integrity of its architecture as would modifications, i.e., building another bridge just downstream."

Commenters 55 and 65

Response. The Keystone Bridge does not presently appear on the National Register; however, it has been nominated. The guidelines as published in 34 CFR 800.10 provide for certain criteria for the determination of eligibility of a site. One of these criteria addresses itself to archetecture; other criteria discuss significance, site integrity, visual and aesthetic values. The architectural value of the bridge is unquestioned, but the historic significance of the site and the visual and aesthetic values of the site would be lost should it be removed or modified (see 36 CFR 800.10 and the Federal Register dated September 12, 1977 for details).

3. Comment. "Page 3-54. Cultural Resources: It appears that cultural resources have been adequately addressed in this document. It is not clear, however, how thoroughly the potential impact areas

have been examined for archeological material. Obviously, some survey has been completed, but this should be clarified."

Commenter 55

Response. The BLM district archaeologist conducted a thorough pedestrian reconnaissance of all areas of potential impact not previously investigated exclusive of Conduit No. 27. Survey of the conduit was contracted by the Denver Water Board during the month of August. Description of these activities may be found in Chapter 2 of the draft statement and in the preliminary case report submitted by the Denver Water Board to the State Historic Preservation Officer.

4. Comment. "Page 4-5. Since the bridge is located on National Forest lands and is federal property, Forest Service concurrence will also be necessary. Also, will the BLM, or will the Denver Water Board prepare the 106/2b statement?"

Commenter 55

Response. BLM as lead agency, has the responsibility to provide a 106/2b statement which would cover all other agencies. BLM recognizes that the USFS owns the bridge and will have concurrence responsibilities. The preparation of a 106/2b is being undertaken by BLM (as lead agency). The BLM will prepare and submit the 106/2b to the State Historic Preservation Officer and the Advisory Council on Historic Preservation when it is completed.

5. Comment. "Page 3-56: 6th Paragraph--Site Number FH-017. Pavillions. The channel of the North Fork of the Platte River has been channelized past this site; therefore, no future damage due to increased flows is anticipated."

Commenter 74

Response. This paragraph under the Historical Resources section in Chapter 3 has been removed from the final statement.

6. Comment. "Page 3-70, under the heading 'Impact of 125 mgd,' under the 'Environmental Element' of 'Archaeological Resources': This impact is overstated. It is suggested that this paragraph be rewritten to coincide more with the text. Preferably, this table could reference the section in which this is discussed."

Commenter 74

Response. The impact is still potentially significant due to possible subsurface archaeological sites. Subsurface sites immediately imply stratigraphy--the rare keystone for analyses.

7. Comment. "Page 5-14, Paragraph 4: There is no basis within the text for the statement that there will be '. . . extensive impact on archeological resources.' This subsection should be corrected in accordance with the Preliminary Case Report which has been prepared in connection with 106/2b procedure."

Commenter 74

Response. The impact is extensive for various reasons: (1) presence of a possible paleo-indian component; (2) unknown extent and stratigraphic deposition of lithic site; (3) even mitigation by excavation or testing is an impact in that excavation is systematic destruction of a site and current thrusts of cultural resource management are to avoid and protect sites rather than "salvage" them.

8. Comment. "Page 5-25, under 'Paleontalogical Resources,' in both columns the word 'would' should be changed to 'could.'"

Commenter 74

Response. Text has been changed in Table 5-6 of the Summary section of Chapter 5 of the FES.

9. Comment. "Page 3-54, under the heading CULTURAL RESOURCES: It is suggested that this section be reviewed so that it is totally consistent with the narrative utilized in the Preliminary Case Report which is currently undergoing the Section 106/2b review. For example, on page 3-55, paragraph 8 it should be pointed out that at such time as flows within the North Fork reach a magnitude which necessitates bank improvement, that [sic] a Corp of Engineer Section 404 Permit will be required."

Commenter 74

Reponse. The text has been revised. See Cultural Resources section of Chapter 3 in the FES.

Recreation Resources

1. Comment. Several respondents submitted comments similar to the following comment: "Nowhere in the Draft Environmental Statement for the Denver Water Board's Proposed Foothills Project have I been able to find any reference to the effect on the South Platte River as it flows through Denver.

"The draft statement does not adequately cover the impact of the Foothills project (in either 125 mgpd or 500 mgpd capacities) on the river flow through the Platte river Greenway."

Commenters 26, 42, 52, 68, 85, and 129

Response. As shown in Tables 2-31 and 3-3, the flows in the South Platte through Denver will be the same without the project as with the project at the 125 mgd level. Concept A in Chapter 8 indicates that at the 500 mgd level with effluent exchange, the flows in Denver could be reduced by as much as 90 percent. However, before any of the raw water concepts could be implemented, a detailed ES would have to be prepared. The specifics of the impacts on the South Platte Greenway and possible mitigating measures would be discussed in that document.

2. Comment. "However, the distinction between the short-term temporary impacts and the more significant and serious permanent impacts is not readily apparent. For example, the loss of 18,000 visitor days use in Waterton Canyon during construction is not nearly as significant as the permanent loss of the unique canyon features and associated recreation opportunities. This needs to be clarified in the final statement."

Commenter 38

Response. The Recreation sections of Chapters 3 and 5 have been rewritten to better distinguish between the short-term and permanent recreation impacts.

3. Comment. "Recreation information used for Chatfield Reservoir throughout the draft environmental statement is based on the 1974 Draft Environmental Statement, Chatfield Lake, Colorado by the U.S. Corps of Engineers. The amount of use projected in this document is not currently taking place. To put this in the proper perspective, data should be obtained from the State regarding existing developments and the amount and type of current recreation use at Chatfield Reservoir."

Commenters 38

Response. The text of the final ES has been revised throughout to include current information on Chatfield Reservoir.

4. Comment. "Chatfield-major alternative. We have found an insufficiency of data regarding the problems associated with this alternative, as well as what (if any) positive recreational effects this alternative may offer. Not having this information hampers a valid comparison of recreation benefits of the canyon vs. Chatfield. In particular, the Draft EIS fails to indicate the huge financial investments for recreation which have occurred at Chatfield."

Commenter 69

Response The Recreation Resources section of the Chatfield alternative (Chapter 8) has been revised to include recreation benefits and investments.

5. Comment. "The table does not carry over one of the most important impacts from page 5-16, i.e., that construction activities would alter or permanently destroy many of the unique and impressive natural recreational characteristics in Waterton Canyon. Also, Numbers 6 and 8 will occur only at 500 mgd."

Commenter 38

Response. Table 5-6 in the Summary section in Chapter 5 of the final statement has been revised to include this information.

6. Comment. Several respondents submitted comments similar to the following comment: "The first full paragraph states that construction of 2.5 miles of non-motorized access trail around Strontia Springs Dam and Reservoir will 'totally eliminate recreation losses.' This statement is very misleading. Although there may not be a loss in the total number of recreationists, the type and quality of the recreation experience will be permanently altered or lost. For example, through-bicycling will be eliminated, kayaking will be eliminated, and the unique and impressive natural recreation features of Waterton Canyon will be severely altered. The same comment applies to the table on page 4-17."

Commenters 38, 39, 69, 100, 116, and 214

Response. The Recreation sections of Chapter 4 of the FES have been revised to indicate that the access trail will partially mitigate losses in recreation use.

7. Comment. "Page 3-59. The effects of draw-down of 44 feet on Dillion Reservoir would be very substantial in terms of visual and recreation impacts. The report does not adequately analyze and

evaluate the implications of this as well as possible meaures to mitigate the adverse impacts created."

Commenter 55

Response. The reference to a 44-foot drawdown at Dillon Reservoir has been deleted in the final ES. Drawdown at 125 mgd will be the same with or without Foothills. Actual drawdown at 500 mgd will depend upon future sources of additional raw water and the means by which this water will be transported to Denver as discussed in the FES, Chapter 8. The effect of each alternative on Dillon Reservoir is also discussed in the No Action alternative and three raw water concepts in Chapter 8.

8. Comment. "I don't believe that the importance and uniqueness of Waterton Canyon is stressed nearly enough. It is my understanding that Waterton Canyon is one of the 10 top streams for river running in the Nation. In addition, many people use the trail who would not otherwise get out-of-doors including the handicapped and blind."

Commenter 57

Response. Chapter 2, Recreation Resources, has been revised to include discussions of kayaking and handicapped use.

9. Comment. "We find that in Chapter 1, Description of the Proposed Action, there is little mention of the recreation opportunities related to the proposed Strontia Springs Dam with the exception of the road from South Platte to the upper end of the reservoir (page 1-34)."

Commenter 58

Response. Chapter 1 includes a discussion of the proposed action. Existing recreation opportunities of the area are discussed in Chapter 2, Recreation Resources. Potential recreation opportunities resulting from the proposed action are discussed as impacts in Chapter 3 or are the result of mitigation measures discussed in Chapter 4.

10. Comment. "Discussions on pages 2-80 and 2-81 indicate the uniqueness of the Waterton Canyon in terms of its scenic quality, wildlife, canoeing, fishing, cultural features, etc. Two areas of concern that are not addressed include the recreation values that the estimated 10,000 annual visitors place on Waterton Canyon and the relationship of the canyon to future recreation planning. The following topics should be addressed."

Commenter 58

Response. As indicated in Chapter 2, Recreation Resources, specific use data for Waterton Canyon is not available. For that reason, the values cannot be specifically addressed. Various plans, including the Colorado State Comprehensive Outdoor Recreation Plan, Draft Environmental Statement for Chatfield Lake, and several other agency reports were considered in preparing the recreation sections of the ES. None of these had specific plans for recreational development of Waterton Canyon.

11. Comment. "A better definition of impacts of the dam and reservoir is necessary as they relate to future recreation planning along the Platte River. There is no mention of the impacts on canoeing."

Commenter 58

Response. Although Waterton Canyon has been identified by various sources as an important recreation area, no definite plans exist for future development. Impacts on white water boating have been included in Chapter 3, Recreation Resources section, of the FES.

12. Comment. "A more systematic analysis of recreation user sensitivity, recreation values, use sensitivity, and future receation planning for the South Platte River in the Waterton Canyon should be provided. Without an adequate description of the proposed action or recreation potential, a complete assessment of the recreation impacts associated with Foothills cannot be established."

Commenter 58

Response. Specific information on recreation use in Waterton Canyon is not available (see Chapter 2). In addition, no agency or organization has developed a recreation plan for the canyon. As a result, the recreational impacts discussed in the statement are based upon estimates of current recreational use.

13. Comment. "In some sections of the DES recreation value seems to be measured only in terms of visitor-use days regardless of the quality or content of those days. This evaluation produces some statements in the DES which are misleading with regard to the impact of the proposed project (and its follow-up projects described in Chapter 8)."

Commenter 68

Response. The quality of a recreation experience is perceived in such an individual manner that it is impossible to measure or accurately describe. Visitor days, as indicated in the comment, do not define the actual number of users. The unit of measure does indicate a level of use pressure that is related to the amount of time recreationists are spending in an area. Recreation visits indicate only the number of people involved with no regard to the length of the visit. Both are used in the draft where possible. However, much of the data available for the area are in one unit of measure only. Without reliable conversion factors, one cannot accurately use both units of measure for each activity or area. The information used is, therefore, the best available.

14. Comment. "Throughout the DES, flows in the North Fork of the South Platte are described as 'hazardous.' It is stated on pg. 2-83 that a hazard to those using the river exists when levels of flow are changed over a short period of time. How quickly do the flows change at, for example, a given point on the North Fork between Foxton and South Platte? How would these statistics compare to comparable figures obtained around local reservoirs and lakes? These questions are relevant because the DES gives the (possibly false) impression that the loss of all or portion of the North Fork of the South Platte is not as great as it might be due to hazardous conditions created even at the current time by water transport."

Commenter 68

Response. According to the USDA Forest Service Regional Office, changes in flow rates probably do not constitute a hazard to recreationists along the North Fork. Although there are no statistics relating accidents on the North Fork to high flows, it is felt that higher flows do result in a more hazardous river. The text throughout the final ES has been revised to include this information. This situation does not exist around local lakes and reservoirs on a regular basis. If it does, no data collection or studies have been done on the subject for those lakes and reservoirs.

15. Comment. Several commenters expressed concern that the estimate of 10,000 visitor days per year was inaccurate and felt that a more accurate estimate would be 20,000. Also, the expected increase in recreation use in the South Platte/North Fork area was considered to be too low an estimate.

Commenters 69, 84, 116, and 132

Response. The recreation use figures for Waterton Canyon have been revised throughout the ES to reflect the estimated use is between 10,000 and 20,000 visitors annually. Use of the South Platte/North Fork area is expected to double by the year 2020. This is a rough approximation of population projections shown in Table 4-1.

16. Comment. "We have found a conflict of figures in the environmental impact statement regarding what the s.a. available for recreation would be with this alternative, i.e. 1,300 s.a. cited on

p. 2-103, and 1,150 s.a. cited on p. 8-83. Though recreation values of the canyon are described, they are not compared with those of Chatfield. As a major alternative to the project, this is necessary to our evaluation."

Commenter 69

Response. The two surface acre figures correspond to the maximum and minimum pool levels when the reservoir is full. For consistency, 1,300 surface acres has been used in the final ES. The available resources of the two areas were considered too different to allow a meaningful comparison to be made.

17. Comment. "Page 8-25, fifth paragraph, second line: Delete the term 'high quality.' The long term recreational impact on recreational activities in the canyon should be added to this paragraph."

Commenter 75

Response. As described in Chapter 2, the recreational opportunities in the canyon are considered to be of a high quality. Reference to the long-term recreational impacts has been added to the final ES.

18. Comment. "The gross insensitivity of the authors to this value is revealed on page 4-13 where you state that the loss of recreational resources due to the consturction of the Strontia Springs Dam and reservoir and access road will be totally mitigated by the construction of a paved trail around the site. You completely fail to understand what brings people to the site now and what will bring even more there in the future-- the beauty and natural environment of a largely undeveloped canyon. I project that recreational use in Waterton Canyon will drop drastically if Strontia Springs Dam is built, and this at a time when outdoor recreation, particularly river oriented recreation, is growing at a much greater rate than the general population. The above mentioned statement should be revised to show that a severe drop in recreational use will occur, unless you can justify any other projection."

Commenter 84

Response. Chapter 4 of the final ES has been revised to indicate that the access trail would "partially" mitigate recreation losses. In addition, Chapter 3 has been revised to state that it is impossible to predict the amount of recreation use lost due to construction of the dam. Although most uses would be precluded around the reservoir, there may be more intensive use of the remainder of the canyon with little resultant loss in total recreation use.

19. Comment. Many commenters felt that the loss of recreational facilities in Waterton Canyon was not sufficiently addressed in the DES. The general opinion was that the destruction of Waterton Canyon as a recreational resource would create an irreplaceable loss. These commenters feel that Waterton Canyon is unique and no replacement exists that combines all the attributes of Waterton Canyon.

Commenters 47, 57, 58, 66, 68, 112, 125, and 162

Response. The Recreation Resources section of Chapter 3 of the final ES has been revised to indicate that it may be impossible to find a specific site which combines all the attributes of Waterton Canyon. Chapter 8 under the Chatfield Alternative has been revised to indicate that other similar areas such as Cherry Creek Reservoir would have to be used.

20. Comment. "The impact on boating on Dillon Lake needs to be addressed along with greater analysis of the impacts on Summit County generally. Attachment #9 is a helpful commentary and it is suggested that the maps of Dillon Lake before and after the projected 74 foot draw-down be included in the final EIS."

Commenter 42

Response. Impacts on Dillon Reservoir would occur when the plant is operating above the 125 mgd level. The specific impacts would depend upon which method discussed in Chapter 8 is used to obtain additional raw water. The effect of each alternative on Dillon Reservoir is also discussed in the No Action Alternative and the three raw water concepts in Chapter 8 of the FES.

21. Comment. "Then, in the chapter on the environmental impact of the proposed project, the complete and irreversible destruction of the river by the proposed project is not even mentioned. There is no mention that the river would be completely destroyed, and that river running would no longer be possible whatsoever."

Commenter 100

Response. The loss of part of the canyon to reservoir construction is addressed in Chapter 3. Chapter 3, Recreation Resources section, has been revised to include the loss of kayaking opportunities.

22. Comment. "The statement fails to mention that many of these visitors are from the low income sector or are handicapped. They are the kind who cannot afford to pay the fees charged at State Parks."

Commenter 132

Response. There is no information available to indicate that a large percentage of the users in the canyon are from the low income sector.

23. Comment. "What are the economic and recreational implications of further channelization and increased stream flows on the North Fork of the South Platte River? It would appear that several residences and other facilities will be affected. Will the road that follows the stream for a considerable distance be inundated? An in-depth analysis was presented for the construction of the dam and the treatment plant yet only cursory attention has been given to the affects of construction of other related structures."

Commenter 129

Response. Channelization efforts on the North Fork will continue without the project, and these impacts are not a result of the proposed project. At the 125 mgd level, flows will be the same as flows without the project. Impacts on streamflow at the 500 mgd level will depend upon the method of obtaining additional raw water as discussed in Raw Water Alternatives section Chapter of the FES.

24. Comment. "The complete channelization of the North Fork will have great impact on the people living in and using that area. The South Fork stream flow conditions during and after construction are not spelled out. The present recreational uses of the South Ford [sic] are presented in a very negative way and leaves the impression that any alteration of the area would be for the better should Foothills be built."

Commenter 145

Response. Channelization of the North Fork will continue without the proposed project; therefore, associated impacts are not evaluated in the ES. As stated in Chapter 3, stream flows in the South Fork are not expected to change. The present recreation use of the South Platte was presented using the best information available. The description is not intended to imply that any alteration due to construction of the Foothills project would be for the better.

25. Comment. "The Draft Environmental Impact Statement is deficient in its treament of Waterton Canyon as a recreation area. To arrive at the number of visitor-days lost, it appears that an old estimate was given a percentage increase and used for this publication. The visitor-days lost is only projected for three years. Does this mean that after three years Strontia Springs Dam will be removed? Also during the three years projected, no annual increase in visitor-days was projected. Virtually all other recreation areas on the Front

Range have experienced annual growth in usage. Why wouldn't Waterton Canyon?"

Commenter 177

Response. The visitor days lost is only projected during the 3-year construction period when the canyon will be closed to recreation use. After construction is completed, the canyon will be reopened to recreationists. Growth in recreation use would likely occur in the canyon; however, with an estimate as general as 10-20,000 visitors annually, which is used in the final ES, yearly increases would be impossible to predict.

26. Comment. Several comments addressed the question of the role of Waterton Canyon in the metropolitan area recreational picture. A particular point was the ability of the canyon to satisfy recreational demand in the metropolitan area for the types of activities available in the canyon.

Commenters 116 and 129

Response. The important role of Waterton Canyon in the metropolitan recreational picture is that it is a unique recreational resource in the area. This has been discussed in Chapter 2. No attempt was made to evaluate the ability of the canyon to satisfy the recreational demand in the metropolitan area for specific activities. The canyon does not satisfy, nor is it capable of satisfying, a significant percentage of this demand.

27. Comment. "Page 5-25, under 'Recreation,' paragraph numbered 3. should be corrected to read: 'The remains of the railroad bed for DSP & PPR would be lost.'"

Commenter 74

Response. This portion of Table 5-6 in the Summary section in Chapter 5 has been revised according to this comment.

28. Comment. "Page 5-25, under 'Recreation,' paragraph numbered 4. describes an impact which is not necessarily adverse."

Commenter 74

Response. The impact would be adverse to those who prefer stream fishing to lake fishing. The impact would also be adverse to those recreationists who prefer trout-dominant fisheries to sucker-dominant fisheries.

29. Comment. "Page 5-25, under 'Recreation,' paragraph numbered 5. indicates an increase in visitors, therefore an increase in

recreation, that is a benefit not an adverse impact. Again, there is no documentation regarding an increase in litter."

Commenter 74

Response. An increase in recreation visitors is not always beneficial. Although more visitor days of use are generated, the experience involved would be different than before and probably not as attractive to those using the area prior to the proposed construction. The direct relationship between increased recreation use and increased litter can be supported.

30. Comment. "Page 5-25, under 'Recreation,' paragraph numbered 6., the word 'some' should be inserted between the words 'for' and 'recreationists.'"

Commenter 74

Response. This item was deleted from Table 5-6 in the Summary section in Chapter 5. The deletion was made due to the determination that increased stream flows were not an impact of the proposed action at the 125 mgd level.

31. Comment. "Page 5-25, under 'Recreation,' paragraph numbered 7. is not substantiated in the text, and should be stricken."

Commenter 74

Response. Substantiation has been added to the text of the FES in the Recreation section of Chapter 5.

32. Comment. "Page 5-25, under 'Recreation,' paragraph numbered 8. should be stricken. See our discussion regarding page 5-17."

Commenter 74

Response. This item on Table 5-6 in the Summary section (Chapter 5) was deleted in the final ES after it was determined that there would be no additional impacts on Dillon Reservoir resulting from the proposed action at the 125 mgd level.

33. Comment "Page 2-81, Paragraph 5: The first sentence should be amended to read'. . . and Cheesman Reservoir provides the best fishing on this section of the South Platte River.' This will avoid the implication that the fishing and water in the canyon is comparable to the fishing in the Decker's area."

Commenter 74

Response. The test has been changed according to this comment. See Chapter 2, Recreation Resources section.

34. Comment. "Page 2-80: Under the section entitled RECREATION RESOURCES, it must be noted that the value of this canyon for recreational activity is exaggerated. In addition, no mention is made of the DWB's provision and maintaining of facilities which enhance the recreational opportunities in the Canyon. Access, litter control, rest rooms, and water have all been voluntarily provided by the DWB. As stated in the draft EIS no exact number of recreational visits is available. No recreational management plan has been prepared for this area by any agency. Without planning and provision of recreational facilities or appurtenances recreational use will adversely impact this area. Without the facilities the DWB has heretofore provided a far greater deterioration of the Canyon would have been realized."

Commenter 74

Response. Present use level estimations and public interest in protection of the recreation resource in Waterton Canyon indicates that the value of this canyon for recreation use is not exaggerated.

The facilities provided by the Denver Water Board are now included in this section.

Although no exact number of recreation visits is known, an approximate level of 10,000 to 20,000 annual recreational visits is utilized.

The USFS Two Forks' Recreation Composite (Plan) has been prepared for the Forest Service lands within Waterton Canyon.

The question addressed by this manuscript is what will happen to the existing resources, not how they came to be in their present condition.

35. Comment. "Page 2-80, Paragraph 3: The implication of this paragraph is very misleading. There are presently two major water diversion structures in the canyon. Therefore, it is not a 'free-flowing river'. The vegetation is of 'diverse types and patterns, but is found in great abundance in all the other major canyons along the Front Range.'"

Commenter 74

Response. Ninety-three percent of the South Platte River in Waterton Canyon is flowing and 7 percent is in the form of pools behind structures. Thus the description "essentially free-flowing river" is accurate.

No statement is made in the manuscript that claims the "vegetation of diverse types and patterns" is unique or even uncommon within the region.

36. Comment. "Page 2-81, Paragraph 2: The first sentence correctly states that, 'The exact number of recreationalists visiting the canyon each year is unknown.' This should be the only reference to recreational visits. All other speculation can be misleading and misused. An example of the misuse of estimates is providing by noting that in this paragraph, the statement is made 'an estimated 10,000 visits were made at the canyon . . . .' This figure is then used on Page 2-102 as if it was [sic] a fact. 'The estimated 10,000 annual visits that occurred.' This should, of course, read, 'Ten thousand annual visits that may have occurred.'"

Commenter 74

Response. Although the exact number of recreation visits is not known, it is undeniable that use has occurred and is continuing to occur. Specialists have estimated the use to be between 10,000 and 20,000 recreation visits per year and have indicated confidence in this estimate. With this knowledge, it would be even more misleading to ignore sound professional estimates and say nothing than to use the estimated data. The DES also repeatedly indicates that the figure is an estimation. No changes are felt to be needed.

37. Comment. "Page 2-118, Table 2-33: Under the heading, 'Future Environment . . .' 1. This statement relative to the Waterton Canyon recreation should be revised to read as follows: 'Waterton Canyon visitor pressure will depend on continued access to the Canyon and quality will depend on recreation management; . . . .'"

Commenter 74

Response. Since the Pike and San Isabel National Forests, Bureau of Land Management, and Denver Water Board are all "landowners" in Waterton Canyon, permanent termination of public access would be dependent upon agreement of such by all parties involved (either federal agency could conceivably acquire legal public access). Public interest in the the continuation of public use in Waterton Canyon is presently so strong that it is doubtful that a closure of public access would be permanently made. The present attitude by the public landowners is toward maintenance of public access. There is no indication that this position will change in the future.

38. Comment. "Page 3-56: The section entitled RECREATION RESOURCES has a very negative tone. Despite their unnaturalness, Chatfield Reservoir and Cherry Creek Reservoir provide over 1.5 million visitor days per year of recreation in the Metro area. The NFSP even with channelization provides many recreational days. Ten Mile Creek's

completely manmade channel is also projected to provide large numbers of visitor days. It seems improper to so negatively describe the recreational impacts associated with this project. It is suggested that this section be revised in the Final Statement to provide more objective treatment."

39. Comment. "Page 3-71, under the heading 'Impact of 125 mgd,' paragraph numbered 7: There is no substantiation in the text for inferring that recreation attendant to reservoirs has more littering that that attendant to rushing streams. It is suggested that this be rephrased as follows:

"'Recreation would change from a stream to a reservoir within a section of the canyon.'"

Commenter 74

Response. The text has been revised. See Table 3-16, Recreation Resources section of Chapter 3, of the FES.

40. Comment. "Page 5-16, under the heading RECREATION: The first paragraph needs revision. Elsewhere in the text there is reference to the loss of recreational days as a result of closure of a portion of the canyon during the construction period. Also pointed out in the text is the fact that wildlife will return to the canyon following the construction period. At such time as the canyon is once again opened up for recreation (after construction), the wildlife will begin returning to the canyon. Therefore, the decrease in recreational experience addressed in this paragraph, if any decrease occurs at all, will be slight and unquantifiable."

Commenter 74

Response. The text has been revised. See Chapter 5, Recreation Resources section.

41. Comment. "Page 5-17, Paragraph 2: The impacts described herein as a result related supposedly with construction at the treatment plant area are grossly exaggerated. These assertions are unsubstantiated and no studies are cited which could be used to extrapolate these impacts from the construction of the proposed project."

Commenter 74

Response. The text has been revised. See Chapter 5, Recreation Resources section.

42. Comment. "Page 5-17, Paragraph 3: This paragraph should be removed since it is stated elsewhere in the text that the drawdown of

Dillon reservoir will occur periodically notwithstanding the Foothills project. Placement of this paragraph in Chapter 5 confuses the reader into imagining a false connection."

Commenter 74

Response. The text has been revised. See Chapter 5, Recreation Resources section.

Land Use

1. Comment. Two respondents submitted comments similar to the following comment: "The expansion of the service area upon agricultural lands is not addressed. From 1960 to 1970, 33,600 acres were lost to agricultural production. The projection is for a conversion of some 134,000 more acres between 1970 and the year 2000. This represents an almost 30 percent reduction in agricultural lands. This is not addressed, nor is the economic loss of the agricultural base to the Denver Metropolitan area. A sizeable portion of these lands are classified as prime agricultural land. The policy of the Denver Regional Council of Governments calls for discouraging new development in these areas."

Commenters 112 and 129

Response. The Foothills ES is site-specific and deals with onsite as well as offsite impacts that are predicted to occur as a result of construction and maintenance of the proposed project. Population and related projections with and without the project indicate that growth in the Denver metropolitan area, both within and outside the existing and proposed DWB service areas, would occur irrespective of the project. Thus, prime agricultural lands would be lost whether or not the project features were constructed. Of the various components of the project, Conduit No. 27 and the second parallel conduit would involve small, separated areas of prime agricultural soils (Regional Classification). Less than 14 acres are affected. These acres would only be affected during installation of the conduits and one to five years thereafter until full agricultural productivity would be restored.

2. Comment. "Page 2-107. Re: Last paragraph. The argument presented is simplistic: is unsupported by empirical analysis; and fails to identify alternative future conditions which would produce different patterns of urban growth and development."

Commenter 69

Response. There could very well be many varied futures for the wide area that is discussed. The statements are educated guesses of future conditions based on DRCOG and other city and county land use plans, including the unaccepted Douglas County Comprehensive Plan.

3. Comment. "The DES does not discuss land-use planning and regulatory mechanisms available to local governments to mitigate the direct and indirect impacts of the proposed project."

Commenter 69

Response. The local governments within the Denver metro areas, acting singly or in concert, have authority under state law to plan and regulate land uses.

Exercise of these authorities can involve either denying, approving, or approving with modification, proposals for land use changes such as new subdivisions, extensions or streets, utilities, unit density, zoning variances and many other interrelated components of the established and prospective infrastructure.

Direct or indirect impacts, if any, that may be attributable partially or entirely to a project such as Foothills can in most situations be resolved through these planning/zoning and other local/regional authorities if there is sufficient public support from the people who would be impacted.

How these authorities are exercised depends upon community or regional goals evidenced in their land use planning and zoning and was not considered appropriate for discussion in this ES.

4. Comment. "I. The analysis of land-use impacts is limited to on-site and adjacent impacts, and there is no discussion or analysis of secondary land-use impacts in the service area, contrary to Council on Environmental Quality guidelines."

Commenter 69

Response In analyzing land-use impacts from the project, the onsite and adjacent impacts discussed were found to be the only significant ones. Within a large metropolitan area such as Denver, project-related secondary impacts (if any attributable to land-use exist) become highly diffused and intermingled with a much larger, established, intricate set or existing infrastructures. These overriding considerations, relative to the five-county Denver Regional Council of Governements and Douglas County are discussed in socio-economic/land-use in Chapter 2, Future without the Project, and again in Chapter 8, No Action Alternative.

5. Comment. "The construction of the staging area will be a serious impact on the Stevens Gulch area. The staging area is given as about 4 acres (page I-34). The staging area as shown on Figure 1-9 (p. 1-35) is confined between the access road and the rerouted stream and appears to scale approximately 1.7 acres. The question arises as to the size of staging area required by the DWB. If the area can only provide I.7 acres, will it be adequate, or will they be looking elsewhere for additional area? Since the staging area will be built within the narrow confines between the road and the stream, the DES should provide more detailed information concerning this area. There appears to be a discrepancy regarding the location of Sevens Gulch stream channel and the existing road. Figure 1-9 (p. 1-35) show [sic]

the existing road east of the stream channel, while Figure 3-14 shows the road on the west side of the channel."

Commenter 55

Response Figure 1-9, Chapter 1, has been changed to show 4 acres is proposed for the staging area.

6. Comment. "Page 1, General Comment: Two items should be clarified on the first page of the report. First, the report fails to specify how many acres of BLM administered public land and National Forest Lands are involved with the Denver Water Board's proposal to build the Foothills Complex."

Commenter 74

Response The acreages of National Forest and BLM lands involved with the project have been added as suggested. See Chapter 1, Introduction.

7. Comment. "It is not correct to state that the Forest Service has decided to issue a special use permit for rights-of-way. The Forest Service action is to decide whether a special use permit will be granted. Additionally, BLM and FS R-O-W must be compatible; either one R-O-W written jointly or two R-O-W's written so as to not conflict. We suggest that the next to last sentence under United States Forest Service be rewritten to read 'The U.S. Forest Service will determine if rights-of-way are to be approved and, if so, the appropriate permits will be granted.'"

Commenter 55

Response The text has been revised. See Chapter 1, Governmental Actions.

8. Comment. "Page 5-26, under Land Use, column entitled Impacts at 500 mgd, paragraph numbered 1 describes an impact which is not necessarily adverse but merely a change of use."

Commenter 74

Response These changes in land use are considered to be impacts as they represent, for practical purposes, commitment of land to a particular use over the life of the project, thereby removing it from opportunity for alternative uses to which the land may be equally or better suited.

9. Comment. "Page 5-26, under the column entitled Impacts at 125 mgd, paragraph numbered 2, this statement is incorrect. Nine acres which will be utilized by roads and eight acres which will be

disturbed but will be restored have been combined into the assertion that roads would occupy seventeen acres. Again a change which is not necessarily adverse."

Commenter 74

Response. Table 5-6, Chapter 5, in the Summary section of the final statement has been changed to show that 9 acres will be permanently occupied by roads and 8 acres will be disturbed by road-associated construction that will require 10 years to restore.

10. Comment "Page 2-108: Another paragraph should be added following the first paragraph. At this point the statement should reference the possibility of the 'Leap Frog Development Scenario' which would alter metropolitan land use patterns and disrupt the existing planning of the region as addressed by Mr. Donald DeDecker in his testimony on behalf of DRCOG on September 15 1977. See also the comments on page 2-91, supra."

Commenter 74

Response Three major factors operate against a "leap frog development scenario" occurring. In order of importance, these are as follows:

1. The direction of land use within the portion of the service area within the Denver region is already largely set by an intricate, existing infrastructure development that encourages and facilitates continuation of land use changes responsive to needs for housing, etc.

2. Within Douglas County, the infrastructure is less advanced and development will be corresponding slower.

3. Within the DWB service area, there is adequate authority for land use planning and zoning and within this authority the place and time of development, if permitted at all, can be controlled to a large degree.

For these reasons, the ES has not been expanded to include a "leap frog development scenario."

Alternatives

Alternatives to the Project

1. Comment. Many respondents felt the draft was deficient in analyzing potential water conservation measures: water recycling, universal metering, conservation education, use of water-saving devices within the home, pricing mechanisms to reduce demand, and the like. Some felt possible effects of water conservation practices and trends being established in respect to better horticultural practices and reducing the need for treated water should be discussed. Many felt reduction in domestic water consumption would drastically effect community lifestyles. Others suggested assessing how well these conservation measures could prevent or postpone the need for the Foothills Project and what the associated effects would be on capital investments and future diversions from western slope.

Commenters 13, 30, 32, 33, 35, 42, 46, 47, 50, 58, 61, 63, 66, 68, 69, 73, 74, 75, 78, 79, 80, 82, 92, 96, 99, 101, 103, 199, 146, 152, 164, 177, 181, 199, 202, 203, 209, 217, and 218

Response. A water conservation alternative has been included in the final statement, Chapter 8.

2. Comment. Several respondents commented on the need for a peak management alternative that would address an efficient method of meeting peak-day demands through enlargement or expansion of treated water storage facilities.

Commenters 35, 42, 65, and 69

Response. A water conservation alternative has been included in the final statement, Chapter 8, which discusses peak management.

3. Comment. Several respondents felt the depth and the scope of the alternatives offered generally were too limited and many other alternatives should have been evaluated.

Commenters 15, 32, 69, 80, 84, 107, 129, and 146

Response. The final statement has been expanded to include one additional alternative in Chapter 8 on water conservation. In addition, the alternatives to the project (major and minor) have been reexamined and expanded.

4. Comment. "One subject which the Foothills Draft Environmental Statement fails to address is the impact upon water rights of building the complex versus not building it."

Commenter 120

Response. No identifiable impacts on water rights would occur at the 125 mgd development level. Impacts on water rights as new raw water is developed has been discussed in detail in Chapter 8, Raw Water Alternatives.

5. Comment. "Our second concern relates to the 'Socio- Economic Implications' of the 'No Action' alternative. That discussion indicates that the loss in the event business and industry are unable to obtain sufficient water supplies to operate is measured by lost wages of about $22,600,000 per week. We would like to point out that the actual loss would be far in excess of that amount. Not only are there the direct wages to consider, but also supplies and raw materials which would not be purchased as well as profits to investors which sould be lost during this period. It is difficult to accurately quantify the total impact of an occurence [sic] such as this, but it would provide such a significant disruption to the long-term economy of the region that we feel you should fully recognize that possibility in your assessment of this alternative."

Commenter 106

Response. Socio-economic impacts have been identified and analyzed to the extent that available data allowed. The socio-economic impacts of the No Action Alternative in Chapter 8 of the FES have been revised.

6. Comment. "Describe the socio-economic implications of alternatives to Foothills with regard to cost."

Commenter 106

Response. The Socio-Economic Conditions section of the Alternatives (Chapter 8) have been rewritten to describe the socio-economic implications of the alternatives.

7. Comment. "Let's look in detail for a minute, and I think the Draft Statement would do well to look in more detail at the effects of the no-action alternative, what would happen if we really just didn't do the Foothills project at all."

Commenter 102

Response. Effects of the No Action Alternative were expanded upon in the No-Action Alternative of Chapter 8, of this FES.

8. Comment. "The no action alternative does not show how other areas have addressed peak day use, nor does it speak to the question of our using what are Eastern United States water habits in the semi-arid climate."

Commenter 220

Response. This discussion is covered in the Water Conservation Alternative, Chapter 8 of this FES.

9. Comment. "In the Draft Environmental Statement submitted (undated), we don't find two viable alternates complete with their estimates, only one alternate is given, Chatfield, and it [is] not dignified with an estimate.

"It would seem that the second alternate should have addressed itself to expanding existing facilities and using the 300,000 acre feet in the Chatfield Dam as a pumpable supply during the peak summer months."

Commenter 155

Response. The alternatives section of Chapter 8 in the FES has been revised, expanded, and one new alternatives has been added.

10. Comment. "Again, as far as minor alternatives are concerned, some are really not alternatives at all. Therefore, the label is misleading. For example, the concept of providing elevator access to the crest of the dam instead of using an access road is unacceptable in terms of logistics and excessive costs in both the short and long terms."

Commenter 99

Response. A minor alternative deals with one or more elements of the proposed project. This alternative is less environmentally expensive than the proposed element, is feasible of development in place of the proposed element, and may or may not be economically comparable to the proposed element.

The elevator access would be capable of moving the personnel and equipment to the dam crest. It would be much less environmentally damaging to the canyon than a higher elevation road beginning in Stevens Gulch staging area and traversing up the canyon on the face of the canyon wall to the dam crest. Specifically, the visual and soil disturbance impacts are much greater with the access road than with the elevator access.

The elevator access is considerably more economically expensive than the road access.

11. Comment. "I have a few more points: Section 2 describes the present environment. It does not, in the section on lifestyles or in the discussion of water use on pages 2-5 and 2-6, estimate what percentage of the water supplied to Denver Water Board users is wasted."

Commenter 207

Response. The DWB states that losses are low within its own system, particularly in areas in which taps are metered; however, in non-metered areas, there is less certainty about the system losses. As for wastage by DWB users, this is not known with precision. However, excess horticultural irrigation can be observed during the summer months, but in-the-household waste in non-metered areas cannot be calculated.

12. Comment. "A small patch of blue grass beside a private home can provide much pleasure. But when Denver is short on treated water and 40 percent of it goes for landscaping and the landscaped areas are extensive, there is a great deal of room for compromise as to when blue grass is necessary and when native grasses, trees and shrubbery will do as well or better. This point is not even touched on in the Draft."

Commenter 104

Response. A conservation alternative has been included in the final statement, Chapter 8.

13. Comment. "Finally, the statement should reflect more completely the fact that the choice of the up-stream dam alternative would preclude the use of the hydroelectric generators contempiated for the plant with the Strontia Springs Diversion Dam and would therefore result in the filter plant requiring an annual demand of about eight million khw instead of being a net supplier."

Commenter 74

Response. The text has been revised in the Upstream Dam Alternative in Chapter 8 of the FES to more clearly show this limitation.

14. Comment. "Page 8-20: The upstream dam alternative is not, in a real sense, a true alternative to the Strontia Springs site for the reason that, as noted in the statement, it would force the operation of the filter plant to change from the planned base-load function to a seasonal peak-load function which, rather than being limited to a

nine-month period as stated in the statement, would be limited as found by studies of the Denver Water Department to a season not exceeding seven months on the average."

Commenter 74

Response. The text has been revised in the Upstream Dam Alternative in Chapter 8 of the FES to more clearly show the operational constraints.

15. Comment. "Another alternate would be 125,000,000 gallon/day treatment plant located with a gravity flow from Chatfield. The 300,000 acre feet in Chatfield equals 268,000,000 gallon/day for a year leaving 55,000 acre feet for flood control of both Plum Creek and the South Platte. The State advises floods only occur in May, June, July and August."

Commenter 155

Response. The low elevation of this site, Chatfield Reservoir, preclude its use on a gravity-flow basis. The Chatfield Alternative in Chapter 8 of this FES gives more details of this alternative.

16. Comment. "Therefore a more rational evaluation of the Chatfield Alternatives should be made."

Commenter 163

Response. The Chatfield Alternative in Chapter 8 of the FES has been revised.

17. Comment. "The Final Statement should include the analysis of the Chatfield alternative prepared by the Colorado Water Conservation Board under date of April 1, 1977, a copy of which is submitted herewith as Attachment 13A."

Commenter 74

Response. Data accrued from the Colorado Water Conservation Board's analysis was included in the DES at the time it was received in April 1, 1977. Their detailed cost analysis was omitted in the DES because Department of Interior policy on ES process precludes this.

18. Comment. "Page 8-27: Elevator To The Dam Crest: Insofar as the Strontia Springs Dam structure as finally selected is of double curvature, thin arch configuration, an elevator constructed as an integral part of the dam structure is no longer possible. Therefore, the construction of an elevator or more likely an inclined railway

from the canyon floor to the top of the right abutment would involve a structure separate from the dam."

Commenter 74

Response. The text has been revised in the minor alternative, Elevator Access to the Dam Crest, in Chapter 8 of the FES to show it as a separate structured railway or elevator.

19. Comment. "We believe that a cost comparison should be provided contrasting the gravity-flow Foothills alternative with various pumping alternatives."

Commenter 49

Response. Two pumping alternatives are shown in the final statement. Cost comparisons are not part of Department of Interior's ES process. However, pumping alternatives are shown in the alternative section of Chapter 8 of the FES with gross costs and energy impacts discussed to the degree that data were available.

20. Comment. Several respondents submitted comments similar to the following comment: "The DES also fails to provide consistent and explicit measures for comparing costs, benefits, and impacts of the various alternatives. At the least, the DES should include a 'balance-sheet' type of cost-effectiveness analysis which provides direct (and, as much as possible, quantitative) comparison of the specific costs, benefits, and impacts of each alternative with all others."

Commenters 42, 55, and 69

Response. This final statement does provide more cost information in the Alternatives section and Table 8 1 in Chapter 8 of this FES.

21. Comment. "Other minor alternatives which should have been considered and evaluated would include a) project access alternatives and b) waste material deposition."

Commenter 55

Response. The project access alternative has been determined by the USFS to be more environmentally damaging than the proposed access up the canyon; therefore, it was not considered as a viable minor alternative. Alternative waste material deposit sites, were considered. Impacts of the sites, were assessed along with other project elements in the DES and found to be no less damaging than the proposed; therefore they were not presented.

22. Comment. Two respondents submitted comments similar to the following comment: "Also, why couldn't the Foothills plant be scaled down and located so that the Chatfield reservoir could provide the necessary storage capacity? This alternative was not considered although it would be a less environmentally damaging project and save the valuable South Platte River and valley."

Commenters 40, 48

Response. This alternative in the Chatfield Alternative is discussed in detail in the manner as suggested in Chapter 8 of the FES.

23. Comment. Two respondents submitted comments similar to the following comment: "I suspect that some double counting of costs has occurred here. The magnitude of the figures suggest that it was assumed that all water hasto [sic] be pumped to an elevation of 5860 feet. If this is assumed, then all foothills pumping savings within the system would accrue. Actually, much of the water may be pumped to much lower elevations (p 1-56) lowering the costs considerably, particularly at the smaller plant sizes.. [sic] This should allbe [sic] refigured on a realistic basis; costs should be included."

Commenters 84 and 155

Response. The gross costs have been recalculated in the Chatfield Alternative in the FES and have been found to be accurate. The DWB states they would not pump to lower elevations because this then would necessitate even more additional pumping as the water was distributed throughout the system.

24. Comment.

"(1) Providing water by pipe from Dillion Reservoir to the Foothills Treatment Plant without the construction of Strontia Springs Dam,
(2) Restructure of water rates,
(3) Enlarge existing treatment and storage facilities,
(4) Conservation measures:
    (a) Meters-Boulder has reduced their water consumption by 20% after installing meters--why can't Denver? Nothing is mentioned about how much water could be saved.
    (b) Shower restrictors could save many gallons.
    (c) Toilets-1000's of gallons instead of the present 7 gallons.
(5) Dual water system-over 40% of the treated water is used for landscaping (watering lawns and trees). Why do we need treated water for the outdoors and toilets? It would seem at the very least new housing areas could be required to water lawns, trees, gardens, etc. with untreated water, thus saving millions of gallons. This should also be discussed.

(6) Recycling water-as previously mentioned, there are many uses for recycled water besides drinking water. It is my opinion that this area should be further explored and treated with a combination of other alternatives."

Commenter 57

Response. Item 1 was considered earlier in the ES process and was determined to be much more environmentally damaging than the proposal; therefore it was not considered as a viable alternative. Items 2, 3, 4, 5, and 6 are now considered in the new water Conservation Alternatives in Chapter 8, of the FES.

25. Comment. "The 'low dam' alternative is referred to briefly but not sufficiently in the EIS. It is to be noted that this writer's comments on the 1976 Draft EIS included a specific request that the cost of this alternative be outlined and compared with the DWD's proposal, but this has not yet been done."

Commenter 42

Response. DWB has not done a complete detailed cost estimate of the "low dam" minor alternative; however, given just the fact that this minor alternative would take 222,170 cubic yards of concrete as compared to the 109,000 needed for the proposal describes in a way the difference in costs.

26. Comment. "Page 8-17, under "Socio-Economic Conditions"- It should be pointed out that the Chatfield alternative would have high energy requirements to pump the water from Chatfield Reservoir to the treatment plant and could have serious impact on the energy available to the metro area."

Commenter 75

Response. Under the Chatfield Alternative section of Chapter 8, a discussion is offered of the energy consumption of that alternative, i.e., 59,442,000 kilowatt-hours at 125 mgd and 217,730,000 kilowatt-hours at 500 mgd. It is impossible to forecast the impacts of this energy consumption on the Denver metro area without getting into a major regional energy forecasting program. At present conditions, these amounts represent a very minor portion of the existing energy consumption in the Denver metro area.

27. Comment. "Page 8-1. Consideration of No-Build is inadequate. Does not explore possible changes in land use patterns to denser settlement patterns leaving majority of irrigated lawns to recreation areas. Increased density would aid feasibility of a viable mass

transit system which would reduce overall VMT which would ultimately reduce air pollution."

Commenter 69

Response. The No Action Alternative in Chapter 8 in the FES explores possible changes in land use patterns and the potential effects of those changes.

28. Comment. "The Draft Statement does not address the possibility of Water Department action to limit the extent of its service area."

Commenter 73

Response. This duscussion has been added to the No Action Alternative in Chapter 8 of the FES.

29. Comment. "Page 8-14 - Modify paragraph under 'System Improvements'-the statistics presented in the Denver Water Board's annual statements and in American Water Works Association Journals indicate clearly that the Denver Water Board distribution system is efficient and experiences below average national loss rates."

Commenter 75

Response. This section has been removed from the No Action Alternative in the final statement because it has been established that the DWB system is highly efficient at present; therefore, no known water savings could be obtained through an increase in efficiency.

30. Comment. "Chapter 6 of the DES fails to address the socio-economic impact of further water diversions from the western slope and is therefore inadequate."

Commenter 69

Response. With or without the project at 125 mgd, raw water diversions will be the same. At 500 mgd, there would be need for additional raw water from the western slope. The final statement addresses the general impacts of these further water diversions from the western slope. See Chapter 8, Raw Water Alternatives in the FES.

31. Comment. "The assessment of conservation in conjunction only with the no-build alternative is particularly distortive and technically incorrect. The 'conservation' program described does little more than depict the dire consequences of not implementing the Denver Water Board (DWB) proposal. The study ought to determine whether a conservation program, alone or in combination with each other alternative, could or could not serve the needs of Denver water

consumers as effectively as the proposed DWB project or any of the other alternatives described. This is not to say that conservation is the ideal or the only solution to Denver's water problems; but simply that the DES has not given an objective and fair assessement of the alternatives available to the Denver region."

Commenter 69

Response. A water conservation alternative has been included in the final statement in Chapter 8.

32. Comment. "5. The statement failed to bring out the additional treatment cost associated with the Chatfield alternative since this alternative would necessitate removal of certain pollutants that are not present at the Strontia Springs dam site where water is diverted to the Foothills Project."

Commenter 156

Response. The Socio-Economic section of the Chatfield Alternative in Chapter 8 of the FES has been rewritten in response to this comment. The text now notes the added treatment costs, operational costs, and initial construction costs.

33. Comment. "When Chatfield is full isn't it possible that there would be a gravity flow to some existing treatment plants thereby eliminating the need for some pumps or substantially reducing the pumping head with considerable power saving? These points are not discussed by they are pertinent and they should be known."

Commenter 155

Response. Chatfield Reservoir is primarily a flood control reservoir; consequently, it will only be filled during periods of flood runoff. Normal pool elevation would be at an elevation of 5426 feet which would not afford an opportunity for gravity delivery (see Figure 1-1). The enlargement of Chatfield Reservoir as outlined in Concept B, Chapter 8, could afford some opportunity for gravity delivery possibly to the existing Marston Treatment Plant. This scheme would require a considerable amount of energy for pumping the treated water through the DWB treated-water transmission system.

34. Comment. "The only element of the proposed action that requires federal permit is the Strontia Springs Dam and Reservoir, and this is one of the major environmental impacts of this particular project. The dam and reservoir, along with its construction roads, will essentially destroy a very, very unique and valuable recreation resource. However, the Denver Water Board could construct the

Foothills Plant and the conduit on private land with no federal action or only minor federal action if they wish and let me outline one way in which they could do this.

"They could use the existing Platte River intake, build a plant at 5600 feet, build a conduit from the Platte River intake or about a thousand feet down the stream level if they want to waive federal land, tapping their present nine-inch conduit to that plant, and then pump from that plant to the Highlands Reservoir at 5722 feet. It has 5722 foot elevation and to entertie conduit 96, assuming a statis [sic] at 1650 feet at that point. If this were done, the Water Board would save $38,000,000. The cost of Strontia Springs Dam and Reservoir, the road up the canyon, and the major tunnel conduit. If this estimate is true, and I suspect it may be a bit low -- it's certainly going to go up.

"Now, why wasn't this particular alternative considered in the EIS."

Commenter 133

Response. The No Action Alternative assumes that no additional treatment plant capacity would be located at the Foothills site. Problems with turbidity, sediment, and ice currently experienced at the Waterton Canyon diversion sites would continue to occur, and electrical energy requirements would continue to increase. Not all costs are reflected by the total capital investment costs. Annual operating, maintenance, replacement, and energy costs are also very important when evaluating alternatives. This alternative was not considered because it will not provide the same end result as the proposal.

35. Comment. "I am convinced there are errors in the conclusions drawn from faulty use of these data. For example, when I used the data presented in Table 8-3 to calculate average daily water availability without Foothills, it appears that wintertime potential excess treated water could be stored to take care of the few days during the summer when treatment capabilities would be inadequate. Reservoirs for storing treated water could be constructed as subterrean [sic] vaults on top of which reacreational [sic] areas could be placed. This would provide more open space for a larger population and eliminate the need to damage the environment in any way."

Commenter 39

Response. Excess treatment capacity during the wintertime does exist and will continue to exist. Use of treated water storage in place of the Foothills Treatment Plant would not provide the ability to reduce the DWB treated-water transmision system electrical energy requirements. It also would pose problems with water quality, i.e., odor and taste. A more thorough disscussion is offered in the new Water Conservation Alternative, Chapter 8, in the FES.

36. Comment. "Another alternative which I do not find, and not suggested on page 29a either, is the possible use of the present Aurora intake and tunnel, perhaps with expansion of it. I do not know to what extent the Aurora water system approaches the capacity of its present flow system, but this certainly offers a possibility of getting water to the proposed Foothills Treatment Plant with no further damage to the South Platte environment."

Commenter 39

Response. Aurora's intake is a 48-inch pipe which, when running full, is capable of diverting approximately 144 cfs. The initial phase of the Foothills Treatment Plant at 125 mgd requires a diversion tunnel capacity of 193 cfs. At 500 mgd, the tunnel capacity required is about 775 cfs. The suggested alternative will not provide for the same end result as the proposal and, therefore, was not considered.

37. Comment. "According to the alternatives section (p 8-14) 'A conservation method that does not appear to have been investigated for feasibility is local storage of treated water during high runoff periods, which could be held for use during water shortage periods.'"

Commenter 34

Response. Treated-water storage (1976) incorporated in the DWB transmission system is 307.8 million gallons. Such storage is incorporated within a transmission system to satisfy instantaneous peak demands which exceed treatment plant capacity. The use of such storage in lieu of treatment capacity presents problems related to a deterioration of water quality, i.e., odor and taste. A more thorough discussion is offered in the Alternatives, Chapter 8, in the FES.

38. Comment. "Why not use existing facilities rather than Strontia Springs or Chatfield. This is not mentioned in the report. Why could not the existing South Platte intake and one or more of the treatment plants be enlarged, presumably at a lesser cost? It costs less to add onto a steel plant than to build a 'green field' new plant."

Commenter 4

Response. The use of Chatfield Dam and Reservoir as an alternative to the proposed Strontia Springs Dam and Reservoir is discussed in Chapter 8. Significant amounts of electrical energy would be required to incorporate a Chatfield-Foothills plant complex into the existing Denver Water Board clear water transmission system.

The suggestion will not provide for the same end result as the proposal and, therefore, was not considered.

39. Comment. Two respondents submitted comments similar to the following comment: "The proposed burial of utility lines appears as an alternative to placing them on environmentally- compatible poles. It is apparently an on-going policy of the Supervisor of the Pike and San Isabel National Forest to require the burial of electric transmission lines which carry under 32 KV.

"The final Statement should discuss this proposal in more detail to emphasize how absurd the proposal is by pointing out the outlandish $1-million cost involved in burying those lines as against the relatively insignificant $100-thousand cost of stringing them on environmentally-compatible poles."

Commenters 74 and 93

Response. In Chapter 8 of this final statement, the burial of powerlines and telephone lines is proposed as a minor alternative and is discussed in a general way. DWB estimates the cost of the buried lines to be $700 thousand and the pole lines to be $200 thousand; this is a significant cost difference.

40. Comment. "The third group concerns the power and telephone lines, these mitigating measures are numbered 17, 18, 19, and 20.

"The reason for separating these from that first category relates to our knowledge of the apparent ongoing policy of the Supervisor of the Pike and San Isabel National Forest, which is to require the burial of telephone lines and electric transmission lines which carry under 32kv. It is suggested that this issue be identified as a possible mitigating measure because of this U. S. Forest Service Policy."

Commenter 74

Response. These mitigation measures (20, 21, 22 & 23) in Chapter 4 of this final statement remain the same as in the DES. The suggested mitigation measure is the same as the underground powerlines and telephone lines minor alternative in Chapter 8 of this FES. The U.S. Forest Service has a planning criteria which suggests that transmission lines be buried below 32 kv size. However, no forest policy to that effect exists.

41. Comment. "The final statement must document that placing power and telephone lines underground raises a number of practical concerns."

Commenter 74

Response. See new dicsussion in Chapter 8 Underground Powerlines and Telephone Lines Minor Alternative in this FES.

42. Comment. Several respondents submitted comments similar to the following comment: "Alternative methods of increasing the supply include:

"(1) The Foothills plant could be built at the currently proposed site to a 125 mgd. capacity, but without construction of the Strontia Springs dam. This alternative was described in some detail at the public hearing by Mr. Ben Harding. The next EIS should analyse [sic] this proposal. It is to be noted in passing that both the Kassler and Marston treatment plants currently operate without a dam across the South Platte River."

Commenters 42, 47, and 68

Response. This proposal was analyzed and found to be infeasible as an alternative to the proposal. This alternative would involve building essentially a new diversion structure, pumping station, transmission conduit, and treatment plant at an elevation where there will be usable head. A cursory engineering and cost analysis reveals the following:

The existing diversion structure diverts into Conduit No. 20, a 90-inch pipeline which feeds Marston and Kassler during certain circumstances. Since it is at capacity now, at least two additional conduits would need to be constructed along with the design and construction of a complete new dam and intake structure. Because of the size of the new conduits and the terrain involved, it would be difficult to lay them any place but in the river. Because of peak demands and a requirement of 500 mgd, there would be no less than two additional 108-inch diameter conduits going to a point where there is enough room to build a pump station. Counting required elevations and transmission losses, the total pumping head would be about 300 feet. Operation of this plant would be for peaking only, and power would cost in excess of $450 thousand per year at the 125 mgd rate. At the 500 mgd rate with expected power rate increases of 8 percent per year, the pumping costs would be in excess of $11 million per year. The horsepower requirements are 9000 HP for 125 mgd and 36,000+ for 500 mgd. Capital cost estimates are available from the DWB.

A number of operational problems would be encountered with this alternative. Foremost among them is the fact the Conduit No. 20 would have to be taken out of service during construction. With the existing demands, this would be impossible even during the winter. There would also be extensive excavation and environmental damage caused by the construction of the pipelines down the canyon to the pump station.

43. Comment. "Page (8-16) The biggest problem in using Chatfield is the loss of energy by pumping the water 7,000 ft. to the treatment plant. Map (2-3) & (2-13) demonstrates that the area directly in front of the Chatfield Dam is sufficient space for the proposed Foothills Treatment Plant. Putting the plant here would elevate the pumping procedure and thus save the energy. A less negative research effort should be done for the use of Chatfield Dam."

Commenter 40

Response While there may be adequate open space (acreage) to place the treatment plant at a site below Chatfield Dam, other problems exist. The low elevation of that particular site would essentially preclude a gravity-flow situation thereby not saving the energy. The text has been changed in the Chatfield Alternative in Chapter 8 of this FES to more clearly show this.

44. Comment. "One alternative considered might have been a separate distribution system for watering and other non-potable needs. The discussion of time and money invested in horticulture has no empirical basis."

Commenter 69

Response The use of a dual system is discussed on a general basis in the Conservation Alternative in Chapter 8 of this FES. A discussion of time and money invested and/or lost on horticulture is offered in the Water Conservation Alternative of Chapter 8 of this FES.

45. Comment. "Page 8-16: The Final Impact Statement should more fully develop and explain the Chatfield alternative's extraordinary deficiencies."

Commenter 74

Response This alternative has been placed in the FES to show the deficiencies in a more complete manner. See the Chatfield Alternative in Chapter 8 of the FES.

46. Comment. "Accordingly, the final statement should more carefully emphasize the deficiencies in the low-dam alternative in the same fashion that it does the deficiencies in the up-stream dam alternative."

Commenter 74

Response Specific text changes have been made in this FES to show in a more complete manner the deficiencies of the low-dam alternative. See the minor low-dam alternative in Chapter 8 of the FES.

47. Comment. "Page 8-1: Major Alternatives: The discussion under the No Action alternative is totally unsatisfactory . . .

"The draft statement rightly presupposes that such a demand-reducing program would have no effect upon the rate of inmigration, but fails to demonstrate for the benefit of the decisionmaker how totally ineffective such a device is in the control of population growth."

Commenter 74

Response The discussion of growth in the No-Action Alternative in Chapter 8 of the FES has been expanded and rewritten.

48. Comment. "In doing so, it also incorrectly states that 54.3% of the Denver customers are unmetered; this information is obsolete. The fact is, that as of 1977 only 42% of the Denver customers were unmetered. The final statement should be corrected to show the correct percentage."

Commenter 74

Response This information was added in the Water Conservation Alternative, Chapter 8, under the metering discussion.

49. Comment "Among other suggestions made by opponents of the project who suggest unworkable ideas in the name of 'conservation' is the suggestion that Denver develop a dual system of water supply by which unfiltered water can be used for the irrigation of landscaped amenities within the service area. The final impact statement should address this consideration by recognizing that Denver already has maximized the use of this idea."

Commenter 74

Response The dual system potential for further application in the DWB service area is discussed in this FES in the Water Conservation Alternative in Chapter 8 of the FES.

50. Comment. "Page 2-91, under the heading FUTURE ENVIRONMENT WITHOUT THE PROPOSED ACTION: Testimony at the public hearing indicated that one of two alternative scenarios will develop in the future under the No Action Alternative. One of those scenarios is as stated in the Draft EIS. The other scenario would accommodate some or most of the future population growth as projected by DRCOG in a

fashion similar to that which developed in the late 1950s and early 1960s as a result of so-called 'blue line.'"

Commenter 74

Response This scenario could potentially develop. The blue line zone is discussed under the No Action Alternative in Chapter 8 of this FES.

Alternate New Sources of Raw Water

1. Comment. Several respondents submitted comments similar to the following comment: "The status of the water resource 'concepts' discussed in the DES is vague and ambiguous, and the assessment of these additional developments fails to discuss the full range of probable effects, especially secondary impacts. The statement that additional federal actions would each be subject to NEPA requirements fails to respond to the contention that federal approval of the Foothills Project would create a commitment to, or prejudice in favor of, further federal actions required for the development of water resources needed to justify the existence of the 500 mgd facility. The evaluation of additional sources of raw water and their environmental impacts cannot be divorced from the Foothills decision, since three fourths of the Foothills Project capacity is useless without additional raw water."

Commenters 32, 34, 42, 44, 46, 69, 72, and 78

Response. The Department of Interior guidelines directed the Bureau of Reclamation to analyze the development of raw water supplies including transmountain diversion facilities, pumping plants, regulatory facilities, and the general environmental impacts. Both the short- and the long-term environmental impacts are described in Chapter 8 in each of Concepts A, B, and C. The future conditions associated with the return flows from the metro sewage plant are estimated to be very similar with or without the project.

2. Comment. Two respondents submitted comments similar to the following comment: "Several alternative water supply concepts, including construction of the Two Forks Dam and Reservoir Project, are discussed in Chapter 8. This information appears to be based on the recent Bureau of Reclamation study of the Upper South Platte Unit. During the course of that study, the Bureau of Reclamation also investigated several other alternatives, including alternative reservoir sites on West Plum Creek and on the North Fork near Ferndale. Since these alternatives were found to involve substantially fewer adverse environmental impacts, they should also be analyzed in Chapter 8. In particular, the West Plum Creek alternative would both avoid the destruction of the unique free-flowing river in Waterton Canyon and create a more valuable recreation reservoir."

Commenters 38 and 146

Response. Information used to develop the alternative water supply comments did in fact come from many previous investigations including the 1974 Upper South Platte Unit study. There were other studies which discussed other alternative plans that could have been used to generate many additional alternative water supply concepts. The three presented in Chapter 8 are only three possibilities; these three cover a wide range of possibilities of general interest. The Department of the Interior instructions and guidelines designated Two Forks site as one of the features to be included as a matter of interest. Actual methods chosen will be subjected to future environmental analyses and environmental statements if they involve major Federal actions.

3. Comment. "The efficacy [sic] of the water treatment process for producing potable water [is] devoid of adverse health effects. This may be extremely important if new energy sources such as coal gasification, oil shale mining, etc., are pursued in or near the watershed with their potential as sources for direct and indirect pollution.

Commenter 41

Response. It is unlikely that there will be any large scale development of oil shale or coal gasification upstream from the diversions. However, in the event such developments were possible and occurred, a National Pollutant Discharge Elimination System (NPDES) permit would be required. Any NPOES permit would require that water quality suitable for existing or future uses be maintained.

4. Comment. "There is no adequate analysis of the Williams Fork extension even though the DWD has undertaken numerous studies of this potential source of raw water. The enlargement of the Gross reservoir is referred to but the full potnetial [sic] of this proposal is never properly discussed. Each of these potential methods of increasing the raw water supply should be frankly discussed."

Commenters 42, 170,

Response. The extension of Wiliams Fork collection system is described under Concept C and generally describes the project as envisioned by the Denver Water Board. A general description of the environmental conditions in the area of Gross Reservoir and potential environmental impacts from the concept is described in Concept A, B.

5. Comment. Two respondents submitted comments similar to the following comment: "The summary discussion in the draft environmental statement on potential impacts of the project should address not only the proposed action as outlined on pages 1-12 to 1-27, but also impacts on cultural resources of interrelated project proposals required for collection and supply of raw water to the treatment plant."

Commenters 43 and 44

Reponse. The development of the water supply concepts was based primarily on recent reports prepared by consulting firms, the Bureau of Reclamation (USBR), and the Corps of Engineers. The USBR collected material from these reports and assembled the data in concepts describing the potential features and the associated environmental impacts. Impacts on cultural resources in those areas where raw concepts features are to be located are generally described and evaluated in the appropriate sections of Chapter 8 of the FES.

6. Comment. Two respondents submitted comments similar to the following comment: "It is felt that the study is grossly inadequate in many areas and the Town would request that further study be given particularly to the social and economic impacts on Summit County, the effect on the environment of Lake Dillon, the lower Blue River and the effect on other western slope areas."

Commenters 54 and 167

Response. The operation of Dillon Reservoir when the proposed Foothills Project is functioning at 125 mgd would not be different from the future conditions without Foothills. Discussion of environmental impacts associated with Dillon Reservoir when operated to meet the full capacity of Foothills Project of 500 mgd is contained in Concept A, Socio-Economics section, Chapter 8. The other environmental impacts associated with these concepts are described in Concepts A, B, and C in Chapter 8.

7. Comment. Several respondents submitted comments similar to the following comments: "I prefer to call your attention to one of the more major fallacies outstanding in the Enviromental Impact Statement (EIS) for the Foothills Project (i.e. Waterton Canyon). In the just released EIS, no mention of the proposed Two - Forks Dam and the effect it would have on the area is even acknowledged."

Commenters 42, 56, 145, 181, and 213

Response. The Bureau of Reclamation was assigned the responsibility of evaluating the potential raw water supplies to meet demands of the proposed Foothills Project when operating at 500 mgd. The potential Two Forks Reservoir in the South Platte Canyon was a required element of this evaluation. This potential feature and the associated environmental impacts are discussed in Concept A, Chapter 8, of the FES. The other potential water resource project facilites are covered in Concepts B and C of the FES. The water project concepts and the associated environmental impacts were described in a general sense and if any of these features are to be finalized, a detailed and specific EIS will be required.

8. Comment. Two respondents submitted comments similar to the following comment: "The impacts which have not been satisfactorily examined include:

"1. The increased salinity in the lower Blue River and Colorado River.
"2. The increased nutrient concentration in Lake Dillon, the lower Blue and Williams Forks Rivers.
"3. The impact on aquatic habitation.
"4. The visual degradation of Lake Dillon for which this community is dependent upon for summer tourism.
"5. The resulting social-economic impacts."

Commenters 67 and 167

Response. The increases in salinity in the Colorado River attributable to various levels of diversion under the three raw water concepts in Chapter 8 were addressed in the DES. Currently, salinity levels in the lower Blue River are low. Any increase in salinity levels in the lower Blue that could be attributable to the diversions would be similarly small since there is no extensive use and reuse of the water as occurs in the lower Colorado Basin. The minor increase in salinity that could occur would have no impact on in-basin uses of the water.

Diversions from Dillon Reservoir itself would not increase nutrient levels in the reservoir. Nutrients are chemically nonconservative, unlike most of the common components of dissolved solids. Nutrients in stratified reservoirs tend to accumulate in the bottom waters. In Dillon, diversions into Roberts Tunnel are made from the deeper waters. As a result, nutrient-enriched water tends to be diverted.

Nutrient levels are more reflective of upstream development. They are not greatly affected by dilution. During the initial stages of the Foothills Project (125 mgd), the increased diversions through Roberts Tunnel would be a significant factor in removing nutrients from the reservoir. On the other hand, at the ultimate level of diversion, which includes the headwaters streams, the removal of diluting water could be significant, especially if there were a large increase in development upstream from the reservoirs.

While there would undoubtedly be some loss of aquatic habitat due to the increase in diversion from the various streams, the Denver Water Board has been cooperating with the Division of Wildlife in developing recommendations for residual flows to preserve the stream fisheries. These studies and consequent flow recommendations are designed to minimize the loss of aquatic habitat.

The visual impacts and socio-economic impacts, related to the operation of Dillon reservoir with Foothills Project operated at 500 mgd are described in Chapter 8, Raw Water Alternatives, in the FES.

9. Comment. Two respondents submitted comments similar to the following comment: "The proposal to exchange transmountain sewer effluent with senior water users on the South Platte River downstream of Denver as set out on page 3-17 is vague and does not provide enough information to adequately assess the increase in water supply as a result of 'exchange'. The exchange criteria as administered in the South Platte River would require replacement of the entire amount of water diverted out of priority so that the increases in water suply as a result of 'exchange' in Concepts A, B and C are not clear."

Commenters 69 and 192

Response. The concept of exchange discussed in Chapters 3 and 8 assumed that all waters diverted out of priority would be replaced. Such replacement waters could come from the crediting of that portion of the wastewater discharge to the South Platte River drainage resulting from the use of the DWB transmountain diversion water during the periods of exchange. Specific criteria for implementing exchange will be developed following detailed studies. Such studies were not conducted at this time.

10. Comment. "Page 2-23 - Dillon Reservoir. Should not the future operation, drawdown, of the reservoir and releases down the Blue River and probable impacts if changes occur be discussed?"

Commenter 69

Response. The operation and drawdown of Dillon Reservoir on the Blue River would be essentially the same with or without Foothills Project at the 125 mgd. Potential impacts associated with the treatment plant at 500 mgd are discussed in Chapter 8, Alternative New Sources of Raw Water.

11. Comment. "Page 3-13, Colorado River Watershed. It would appear this 125 mgd proposal may have some impact perhaps not on the watershed but on individual streams."

Commenter 69

Response. The description of the impacts on the Colorado River watershed would essentially be the same with or without the Foothills plant at 125 mgd. The text in the Water Resources section of Chapter 3 has been revised to note this condition. Essentially there will be no impact on the surface water in the Colorado River watershed with the project different than the future environment (year 2010) without the proposed action at 125 mgd.

12. Comment. Two respondents submitted comments similar to the following comment: "The DES also does not address the environmental

and socioeconomic impacts of further transmountain water diversions on the long-term development and productivity of the Western Slope."

Commenters 69 and 167

Response. Discussions of these general concepts and the long-term environmental impacts are covered in Concepts A, B, and C, Chapter 8, of the FES.

13. Comment. "In any case, the likely destruction of 19 miles of the South Fork of the South Platte and 7 miles of the North Fork should be presented very clearly along with statements which address only the flooding of 1.7 miles of stream in Waterton Canyon. More frequent mention should be made throughout the DES of the consequences of Concepts A, B, C."

Commenter 68

Response. The impacts related to streams through possible implementation of all concepts (A, B, and C) is described in Raw Water Alternatives, Chapter 8 of the final statement. These impacts are not associated with the proposed Strontia Springs diversion structure and Foothills Project. The inundation of the 1.7 miles of Waterton Canyon is presented in various elements of Chapter 3 of the FES.

14. Comment. "The Draft Statement should explore the environmental impacts associated with developing alternative additional sources of raw water supply for the 520 mgd level of operation for the Foothills Project in as great a detail as that required for the project itself."

Commenters 69, 73, and 80

Response. The subject FES describes and analyses the specific environmental impacts associated with Foothills Project at 125 mgd. The Department of the Interior directed that an additional discussion should be prepared on the sources of new raw water supply and the potential impacts associated with these new raw water supply developments. If in the future any of the alternative water concepts are formulated and presented for approval, specific environmental statements would be required for any such developments.

15. Comment. Several respondents submitted comments similar to the following comment: "Although the DEIS correctly states that these depletions are allowed for under the terms of the Colorado River Salinity Program, the impacts of salinity due to these proposed diversions and methods to mitigate these impacts need to be fully disclosed under NEPA requirements."

Commenters 74, 78, and 125

Response. The impacts of specific projects which may be similar to features in Concepts A, B, and C will be fully analyzed in specific statements if these developments are proposed. Impacts and mitigatory measures are discussed in the FES for Titles I and II of the Colorado River Salinity Control Program.

16. Comment. "In addition, we feel more emphasis should be placed on increased Colorado River salinity problems that deal with extensive transmountain water diversions as discussed in Chapter 8 of DES."

Commenter 79

Response. The level of detail required for environmental impacts resulting from the potential Concepts A, B, and C is general as directed by the Department of the Interior.

17. Comment. "Pleas [sic] include in the final document some analysis of the environmental and economic impact of the increased salinity concentrations in the Colorado River Basin. The Bureau ofReclamation [sic] estimates that the annual cost to downstream users of increased salinity is $230,000 for each lmg/l increase. Thus, the full utilization of the DWB projected suplies [sic] would cause an additional cost to downstream users of $4-5.5 million."

Commenters 84, 100, 101, 107, 167, and 220

Response. The impacts of transbasin diversion with or without the Foothills Treatment Plant at 125 mgd are exactly the same. Evaluation of economic impacts on the Colorado River users has been evaluated in a narrative form describing the increases in salinity concentrations resulting from various collection and diversion structures identified in the raw water concept. At this time, it is impossible to determine the decreases in water quality for the secondary and tieriary economic impacts which might result from the implementation of part or all of the described concepts. When definite proposals for these measures are needed, specific EIS statements will be required with cost impacts to consumers.

18. Comment. Several respondents submitted comments similar to the following comment: "It does not: [sic] however, adequately assess the impacts of construction, operation, and maintenance of a 500 mgd water system as proposed in concepts A, B, and C.

"It is our understanding that expansion to the 500 mdg level will be addressed in a seperate [sic] environmental impact statement.

"The statement does not consider other logical structural alternatives such as a conduit system that could carry the water from the mouth of the Roberts Tunnel to the proposed Foothill treatment plant. Such an alternative would reduce the adverse environmental impacts on fish and wildlife resources associated with the proposed project at 125 mgd and may significantly reduce adverse impacts associated with alternatives A, B, and C. Also, this alternative may offer additional opportunities for hydroelectric power-generating capability."

Commenters 85, 125, and 127

Response. Impacts of construction, operation and maintenance of any of the concepts (A, B, C) are described in Chapter 8. The concepts were formulated using previously studied plans for which cost and benefits had been developed. Formulations of specific plans for raw water developments may consider many new alternative plans.

19. Comment. "The second direct impact, socio-economic impact upon the South Platte communities. The socio-economic impact of the proposed project especially in its 500 mgd stage which requires additional water will have an economic impact beyond the Denver area. Specifically, the construction of Two Forks Dam and Reservoir that will eliminate and/or disrupt some old and stable communities along the South Platte River. The economic losses sustained by these people in terms of future livelihood, land, and dwellings is not covered."

Commenter 112

Response. The socio-economic impacts of the potential storage reservoir, Two Forks, are generally discussed in Concept A, Socio-Economic Conditions, Chapter 8 of the FES.

20. Comment. "As we have stated in the past, it was an error to include in Chapter Eight, a discussion of raw water alternatives. That discussion was not legally required, has no bearing on the agency's substantive decisions on the project and, as an informational part of the document can only serve to confuse the public."

Commenter 93

Response. The guidelines and criteria used to prepare the description and analysis of potential raw water supplies for the Foothills Project are described in the first sections of Alternate New Sources of Raw Water, Chapter 8, of the FES.

21. Comment. "The consideration of the Two Forks alternative in Concept A we believe is an outright fraud. The Bureau of Reclamation, which had the responsibility for the preparation of this section of the Draft, has spent hundreds of thousands of dollars of taxpayer's money studying Two Forks at a total storage capacity of 975,000 acre feet. The Bureau's pesentation of a Two Forks Project with a storage capacity of 305,000 acre feet, less than one-third the actual proposed

capacity, appears to be an intentional attempt to cover up the true impacts of the proposed project."

Commenter 127

Response. Some of this information was based upon information gathered in an earlier investigation of the Upper South Platte Unit, which would provide for a multipurpose reservoir rather than the smaller single purpose reservoir envisioned with Foothills. Reclamation estimated that a smaller amount of storage would be required to regulate the raw water supply to serve Foothills Project at 500 mgd. The environmental impacts associated with the smaller reservoir are not materially different and the general evaluation was considered adequate for the purposes of the Foothills EIS.

22. Comment. "Therefore, I would think the raw water development alternatives should be a detailed part of this Draft Environmental Impact Statement. Including: overall cost of the total system, estimated by some to be in the billions; the effects of raw water development on the annual changes in reservoir water levels; and effects of raw water collection on salinity in the Colorado River."

Commenter 177

Response. Economic evaluation of the proposed Foothills Project for any of the project features described in Concepts A, B, and C is not appropriate in the FES. The environmental impacts associated with the proposed Foothills Project are contained in Chapter 3 of the FES. A general evaluation of the environmental impacts associated with Concepts A, B, and C are found in Chapter 8, Alternative New Sources of Raw Water.

At this time, it is impossible to determine the decreases in water quality for the secondary and tieriary economic impacts which might result from the implementation of part or all of the described concepts. When definite proposals for these measures are needed, specific EIS statements will be required with cost impacts to consumers.

Evaluations of impacts on the salinity of the Colorado River for a treatment plant of 125 mgd is discussed in the Socio-Economic Section of Chapter 3, and a treatment plant of 500 mgd capacity is discussed in the Raw Water Alternatives section of Chapter 8.

23. Comment. "Consideration is not given in the Environmental Document sufficiently as to a consideration of Western Slope water rights or salinity as is being considered in the Environmental Defense Fund Case where the salinity of the Colorado Rivers is being decided in the Courts. There is no addressal of requirements of the

reservoirs themselves, especially with regard to the Turkshead and the Two Forks."

Commenter 183

Response. In order to divert water to the eastern slope, water rights on the streams in question must be held by the Denver Water Board. In order to exercise their water right, no senior downstream water rights can be harmed. Therefore, there will be no effect on west slope water rights. This will be assured by the State Engineer.

The lawsuit filed by the Environmental Defense Fund against the Environmental Protection Agency and the Department of the Interior concerns the approval of non-numerical standards developed by the Colorado Basin. If numerical standards are established, the effect of future projects relative to the standards would have to be evaluated. Currently, the absolute change in salinity attributable to a project must be evaluated. This was done in the Foothills DES.

24. Comment. "Number one, on Page 8-60 under Concept A, the first full paragraph, there is no substantiation of the statement that the flows between Strontia Springs Dam to Chatfield Lake would be reduced by approximately 90 percent. I cannot imagine how the percentage was determined."

Commenter 198

Response. The reduction of flows in the South Platte River downstream of Strontia Springs Dam with the Two Forks Reservoir (Concept A) was predicated on the assumption that about 10 percent of the average flow at Waterton (1964-73) would remain. The assumption reflected the implementation of exchange criteria and the acquisition of downstream water rights. Specific details were not identified nor were they analyzed.

25. Comment. "Number two, Page 8-72, Concept B, the fifth full paragraph. The statement of Congressional review to obtain authorization to modify Chatfield Dam and Lake would be true, however, I find nothing in Concept B as to the political impact of obtaining this authorization."

Commenter 198

Response. A congressional review and authorization would be required to modify Chatfield Dam and Lake as described in the FES. It is through this congressional action that the political process would come into play.

26. Comment. "A thorough discussion of the Colorado River Compact and the effect of the removal of all this water for the purposes of Denver should be included and I couldn't find it."

Commenter 183

Response. Waters of the Colorado River watershed presently and potentially available to DWB would be accountable under the State of Colorado entitlement to the use of Colorado River waters pursuant to the Colorado River Compact, Upper Colorado River Compact, and State of Colorado water law. General discussion of the effects of the potential new DWB Colorado River diversions is presented in Chapter 8, Alternate New Sources of Raw Water.

27. Comment. "Item 3 -- Page 8-77, Concept B, last full paragraph. The Statement that the enlarged reservoir would regulate the water from the Blue and South Platte Rivers is untrue. This regulation is under the authority of the State Engineer."

Commenter 198

Response. The regulation addressed in the paragraphs relates to the physical control of the flows of the South Platte River watershed and the diversions from the Blue River, not the administrative control as exercised by the State Engineer.

28. Comment. "There is a brief discussion of the effects of increased out basin diversions on salinity in the Colorado River Basin on page 8-110. The discussion is limited and tends to reflect the attitude that nothing can be done to mitigate or reduce the damage and the Colorado River Basin in Western Colorado must simply bear the burden of the increased salinity. We request that the issue be addressed in detail and that the economical damage resulting from the increased salinity caused by increased transversion of high quality water be addressed in detail and that no right of way or use permit be issued by the Bureau of Land Management for the Foothills treatment complex without provision for and enforcement of the assignment of the salinity burden and economic damage to the Colorado River Basin water users caused by diversions of high quality water from the Colorado River Basin to the Foothills treatment plant."

Commenter 50

Response. Site-specific environmental assessment will be required for any eventual federal decision and action that is related to the development of any of the alternative raw water supplies discussed in Chapter 8.

29. Comment. "We request that the Final Statement include an analysis of the availability of pumping energy and its sources

including the option that the energy be generated and the pollution load assumed in Metropolitan Denver and not on the Western Slope."

Commenter 50

Response. Discussion of pumping energy requirements is presented in Chapter 8, under Concept C of the Raw Water Alternative section of the FES. No specific source of energy was identified.

30. Comment. "We request also that the Department address in detail its decision that 35,000 acre feet will be available to Denver from that portion of the system labeled 'Lower Eagle' on Figure 8-5 on page 8-95 when the Denver Water Board does not have a decree for the water."

Commenter 50

Response. The 35,000 acre-feet is estimated to be physically available from the "Lower Eagle" based upon the assumption that waters proposed to be diverted from locations now within the wilderness area could be diverted at an alternate location subject to the obtaining of appropriate water rights.

31. Comment. "We request that the Final Statement address the following facts:

"The Denver Board of Water Commissioners does have a decree for Homestake Creek and Eagle River waters which the Draft assumes to be capable of supplying 32,000 acre feet (Figure 8-5, page 8-95). We request the Department to explain how it determined that 32,000 acre feet is available to the Foothills plant when Denver is junior in the priority system on Homestake Creek and the Eagle River to both the existing Homestake Project and its expansion owned by the cities of Colorado Springs and Aurora, and the Colorado River Water Conservation District's Redcliff Project pending before the Federal Power Commission."

Commenter 50

Response. See Roberts Tunnel Colleciton System, Eagle-Piney/Eagle Colorado Water Study, Eagle-Piney Operational Configuration, Parsons, Brinkerhoff, Quade, and Douglas, Inc., Forrest and Cotton, Inc., June 1974. Use of information presented in this report along with the assumptions presented led to the estimate of 32,000 acre feet.

32. Comment. "Although the proposal in Concept B may or may not be inconsistent with the Blue River decree and stipulations, it does not appear that Concept B addressed the question of the required pro tanto

reduction of diversions from the Blue River as set forth in paragraph 4(g) of the stipulation. We request that the Final Statement address that provision."

Commenter 50

Response. Analyses of the use and place of use of Blue River water in relationship to the use by the DWB of waters from sources other than the Blue River was beyond the scope of this environmental statement.

33. Comment. "At page 8-56 there is discussion of tourism and recreation in Dillon Reservoir. The DWB holds decrees for Dillon Reservoir and in supplying a water treatment plant at the Foothills may draw essentially all of the water from Dillon Reservoir. We request that the Final Statement include an analysis on the effect on recreation as a result of the DWB drawing all of or nearly all of the water out of Dillon Reservoir."

Commenter 50

Response. The withdrawal of water from Dillon Reservoir will occur with or without the Foothills Project. The amounts will depend upon the hydrologic, climatic, and demand conditions in any given year or sequence of years. Generalized effects are presented in Chapter 2, Future Environment Without the Proposed Action, and Chapter 8, Alternate New Sources of Raw Water, in the FES.

34. Comment. "At page 8-32 and Table 8-14 on page 8-35 we find language that indicates the enlargement of the Moffat system and Roberts Tunnel would increase diversion from the Western Slope by approximately 52,000 acre feet; this includes collection from Straight Creek diverted to Dillon Reservoir. We request that the Department of Interior to explain the source of its data and calculations whereby the increases of 19,000 from the Moffat system and 33,000 from the Roberts Tunnel is determined and the basis of the decision assuming diversion from Straight Creek."

Commenter 50

Response. With expanded Gross Reservoir capacity, additional capability to regulate flows originating above the existing Moffat Collection System facilities would exist to the extent that such flows were divertible pursuant to water rights held by the DWB. The increase in Roberts Tunnel diversions is attributable to having regulation capability within the South Platte watershed and that such waters are divertible pursuant to the Blue River Decree. Straight Creek diversions are predicated upon DWB information reflecting a filing for potential Straight Creek diversions and estimates of yield.

No detailed operational studies were conducted by the Department of Interior.

35. Comment. "In each of the concepts the Department of Interior assumes increased transmountain diversion of high quality water without consideration of the fact that in most cases Denver does not hold decrees for the water. In Civil actions 2371, 1549, and 1548 the Master Referee ruled that'...there's been no demonstration that the Board of Water Commissioners of the City and County of Denver formed a definite intent as of the date claimed to proceed with these projects...' He ruled that the DWB did not show it intends to appropriate water from the West Slope streams that are assumed in the Draft Statement to be available to supply Foothills. We request that the Final Statement include detailed discussion explaining why the Department of Interior has assumed Colorado River Basin Water should be diverted to the Foothills plant when the DWB did not form an intention to divert it."

Commenter 50

Response. This matter is being contested in the courts of the State of Colorado, and no further comment is warranted at this time.

36. Comment. "The last paragraph under the subheading Water Resources is a cursory discussion of the increased salinity in the Colorado River caused by increased out basin diversions. We request that a full analysis of the salinity detriments including economic effects in the Colorado River Basin in Colorado caused by increased transmountain diversions be presented in the Final Statement."

Commenter 50

Response. Water rights presently held by the DWB for its existing facilities entitle the DWB to divert certain quantities of water. As the water demand increases, increases in diversions to the extent such water rights allow, will occur with or without the proposed Foothills Project. All water quality discussions have been revised throughout the text to include discussions of salinity as it pertains to this project. Salinity changes due to future transmountain diversions are discussed in Raw Water Alternatives of Chapter 8 of this FES.

37. Comment. "On page 8-15, in the third full paragraph under the subheading Water Resources is the comment that 'Average annual flows downstream of Dillon Dam would be reduced by the amount of increased diversions through Roberts Tunnel.' This statement appears to assume that the Blue River decrees and stipulations are to be ignored. We request that this comment be clarified in the Final Statement."

Commenter 50

Response. Diversions by the DWB through the Roberts Tunnel are limited to the amounts available pursuant to its water rights. Additional diversions pursuant to its rights would decrease spills downstream to the Blue River.

38. Comment. "We request the data base, hydrologic and water rights assumptions be shown in detail in the Final Statement or that the Final Statement show that the Colorado River Basin water assumed to be available to Foothills is not available or is seriously questionable."

Commenter 50

Response. It is acknowledged that the water supply figures developed for each concept were not developed by actual operational studies and that thorough analysis may reduce the estimated water supplies in the concepts presented (see Chapter 8, Alternate New Sources of Raw Water). The question of legal and economic feasibility of the alternative raw water sources was beyond the scope of this environment statement.

39. Comment. "At page 5-2 under the heading Water Resources, and the subheading Surface Water, in the first paragraph we find the continuing assumption that a 500 mgd plant must be constructed and that the additional raw water supplies must come from the Colorado River Basin of Western Colorado. 'Colorado River Basin flows would reduce and South Platte River flows would both increase and decrease depending upon...' We request that the Final Statement include a complete analysis of the adverse impacts on Western Colorado and Western Colorado streams with full discussion of why the Department of Interior thinks increased diversions from the Colorado River cannot be avoided."

Commenter 50

Response. Decisions related to specific raw water sources are not to be made on the basis of this environmental statement and no federal action regarding the development of these potential sources is proposed pursuant to policy established at the time it was decided to expand discussion within the Foothills ES. Future site-specific environmental assessment will be required for any eventual federal decision and action that is related to the development of the alternative water supplies. It is anticipated that most, if not all, raw water sources would require a federal permit at some level.

40. Comment. "We request the tone and specifics of the Final Statement emphasize alternative Eastern Slope water sources and the bias towards increasing diversions from the Western Slope be eliminated."

Commenter 50

Response. Consideration of alternative raw water sources includes the transfer of South Platte and Bear Creek ditch rights and the exchange of transmountain effluent and is reflected in Concepts A, B, and C. Details related to which rights would be transferred or how exchange might be effected were not developed. Actual exchange of Blue River water by the DWB was initiated on September 10, 1976. Quantities ranging from 59,000 to 112,000 acre-feet were estimated to be potentially available as a result of sewage effluent exchange and acquisition of water rights by the DWB on the eastern slope. This ranges from about 65 to 32 percent of the additional raw water shown needed in Concept A, B, and C in Chapter 8 of the FES.

41. Comment. Two respondents submitted comments similar to the following comment: "There is no mention of the amount or accessibility of underground water resources, the cost of developing them or what effect development of this resource would have on mitigating the 'shortage' problem. I refer here to an article in the July 3, 1977 edition of the Rocky Mountian News in which a Colorado State Water Resources Engineer said that Denver is located over a vast undergound aquifer which holds 'about 154 million acre feet enough to supply the Denver Water Boards [sic] customers at current use rates for 600 years.' I don't advocate full scale development of underground resources for municipal purposes but if we permitted more horticultural wells to be installed, there would be no need for the Foothills plant and additional mountain water development."

Commenters 69 and 132

Response There are a plurality of various raw water sources that could have been examined. Three most likely ones were chosen for presentation. If development involves a major federal action, additional environmental assessment will be required under NEPA.

A report entitled Ground Water Resources of the Bedrock Aquifers of the Denver Basin, Colorado, published in 1976, was prepared by the State of Colorado, Department of Natural Resources, Division of Water Resources, and indicated that "Development of the aquifers in the Metro area should proceed with caution and with the realization that all previous data indicate the water is being 'mined' and will be available for pumping for a fixed time." The report also indicated pumping depths required may ". . .demand the use of pumping facilities which might lie far beyond the economic capabilities of the private well owner. . .tax common pumping equipment and impose heavy economic burdens on the well user."

42. Comment. "Re: paragraph 4: It should be made clear that the utility of this project depends on the Two Forks Dam project (or equivalent) and proposed facilities on the Blue and Eagle River watersheds."

Commenter 69

Response. The utility of the project is dependent upon (1) a demand for treated water at levels commensurate with the plant capacity, and (2) the availability of raw water commensurate with the demand. Alternate sources of raw water are discussed in Chapter 8.

43. Comment. "The interrelation ship [sic] between the Strontia Springs/Two Forks System and the Narrows Dam in Weld County should be examined."

Commenter 84

Response. The two projects are not interrelated and do not function together as a unit. Therefore, the Narrows Dam was not covered in the interrelationships section of Chapter 1.

44. Comment. "The concepts regarding alternate new sources of raw water are woefully inadequate in their assessment of water to be obtained through 'exchange.' No supporting facts are given as to just where this water will come from or its impact."

Commenter 81

Response. General discussion is presented in Chapter 8, Alternate New Sources of Raw Water. South Platte River flows would be diverted or stored out-of-priority to be exchanged or replaced downstream of Denver by wastewater effluent resulting from transmountain diversion. Flows of the South Platte River through the Denver metropolitan area could be greatly reduced depending upon the extent to which such exchange may be implemented.

45. Comment. "The statement contains no data as to the number of acre feet of stored raw water that would be necessary for the treatment plant and only cloudy data as to the capacity (acre feet) of Two Forks."

Commenter 81

Response. The projected DWB raw water demand is about 406,000 acre feet at the time the full 500 mgd treatment capacity is anticipated to be required (see Table 1-4). Chapter 8, Alternate New Sources of Raw Water, presents general discussion of Two Forks Dam and Reservoir. A total storage capacity of about 550,000 acre feet was estimated to be required. This capacity was dependent upon the assumption that the exchange of transmountain effluent and acquisition of water rights would entitle the DWB to utilize about 90 percent of the annual flows of the South Platte River at Waterton. Lesser ability to use the Waterton flows would increase the storage capacity required.

46. Comment. "The EIS reports on Page 6-3 that the permanent work force needed to maintain the project would enhance the long-term productivity of 35 families in the transportation and public utilities work force. But where is the reference to what the project (particularly the construction of Two Forks) will do to the families who live along the area of the South Platte that will be inundated by the dam reservoir? What happens to the productivity of the families who will lose their homes in Deckers and Foxton? They seem less important in the EIS than the utilities workers."

Commenter 21

Response. The project addressed is the Foothills Project and not the construction of Two Forks Dam. Since this document makes no recommendation for or against the construction of Two Forks Dam, the discussion of general impacts related to the development of additional raw water supplies is presented in Chapter 8, Alternate New Sources of Raw Water, in the FES.

47. Comment. "The relevance of the subject plan in the context of the Department of Agriculture Colorado River Quality Improvement Plan, dated May 1977."

Commenter 41

Response. The document apparently referred to is entitled "Final Environmental Statement, Colorado River Water Quality Improvement Program," dated May 19, 1977. The FES was prepared jointly by the USDI, Bureau of Reclamation (lead agency), and the USDA, Soil Conservation Service. The document depicted future potential DWB Colorado River watershed diversions and estimated effects on downstream water quality. The DWB diversions depicted were one of a number of future additional water uses reflected in the May 19, 1977 FES.

48. Comment. "It is suggested that some such graphic presentation of the raw water supply problem be included in the next EIS."

Commenter 42

Response. Chapter 8 has a detailed description of raw water supply problems in this final statement. Each of the raw water concepts discussed in Chapter 8, Raw Water Alternatives, is accompanied by a map, a water supply schematic and a table of water data.

49. Comment. "Construction of the $135,000,000 Foothills Treatment Plant will be useless to the Denver Metropolitan area unless additional raw water sources are diverted to the Foothills site. Yet where are the details of these additional diversions? where will they

be located? what will be their environmental impact? how much will they cost? If, in fact, these additional projects will cost as much as various articles in the newspaper have reported them to cost, i.e., in the neighborhood of $1 billion, what are all the alternatives to such an expense? The purpose of an EIS as I understand it is to give the average taxpayer and citizen the facts upon which to make an intelligent and well-informed decision in these kinds of technical issues. Since the EIS does not cover the full scope of the project, the complete costs, nor the alternatives of conservation and recycling I do not feel that it has done the job for which it was intended. And I do not feel that I have enough information, therefore, to support the project as outlined in the EIS."

Commenter 21

Response. The construction of the Foothills Treatment Plant will enable the DWB to satisfy treated water-demands during the peak use period of the year. As population growth occurs, both the peak-day demand and the annual demand are projected to increase. With the projected increase in annual demand, additional raw water supplies would be required. General discussion of potential sources of raw water is presented in Chapter 8. If additional sources of raw water are developed, further environmental analysis must be completed prior to development. ES preparation policy excludes a detailed discussion of cost-benefit analyses.

50. Comment. "The environmental impacts of the common elements of Concepts A, B, and C should be collected and discussed in one place in order that the reader will appreciate that certain consequences are bound to occur regardless of the project ultimately chosen for increasing the raw water supply."

Commenter 42

Response While there are some advantages to a collected discussion of all three concepts, it is considered to be more comprehensible to the reader in separate sections, especially in view of the complexity of these varied locations and widely diversified concepts. The text in the FES was not changed.

51. Comment. "Page 8-31. Analyses of other alternatives especially the water supply concepts (i.e. Two Fork Reservoir) does not address probability of contrived low density sprawl which has direct implications for financial liability of State and locals to provide and maintain the necessary road facilities. Low density sprawl also has direct implications of a resultant increase in air pollution levels."

Commenter 69

Response Please see the rewritten Future Without the Project (Chapter 2 of the FES) and the rewritten No Action Alternative (Chapter 8).

General

1. Comment. "1-32 The revised DES appears to have made a major change in the proposed widths for the access road in the South Platte Canyon. As now proposed, the entire roadway would be 22 feet wide. The original proposal, which reflected agreements by several agencies, called for two sections of 14-foot roadway with turnouts (station 247+71 to 275+83 at the Keystone Bridge, and station 340+50 to 350+50). These narrow sections would preserve aesthetically pleasing segments of the road with narrow rock cuts over the old DSP&P railway. It would be difficult, if not impossible, to construct a 22-foot roadway through these sections without unacceptable damage to the rock canyon walls, or the stream, or both. We feel these two segments should be constructed as a 14-foot roadway with turnouts as originally planned. It is not made clear why a 22-foot roadway is necessary for both the Proposed Action (p. 1-32) and the Lower Dam Minor Alternative (p. 8-26), while it is acceptable to upgrade the road to a 14-foot width with turnouts for the Upstream Dam Alternative (p, 8-22)."

Commenter 55

Response. The project proposal has been amended to construct 22-foot roadways instead of the 14-foot originally proposed. The reason is that both the State and Federal Occupational and Safety Hazard Agencies made declaratory statements to the BLM interagency team to the effect that the 14-foot roadways were inadequate for safe construction activity. In Chapters 1 and 8 of the final statement, an explanation is presented in more detail.

2. Comment. "It should be pointed out, however, that the BLM, the U.S. Forest Service and Corps of Engineers have questionable legal authority to impose so-called mitigating measures which relate to the treatment plant complex, that work which will occur on non-federal lands and that work which does not involve the jurisdiction of section 404 of the Federal Water Pollution Control Act."

Commenter 74

Response. The federal action requested by the applicant on federal properties is, by the nature of these activities, tied directly to the remainder of the project; therefore, there is a responsibility to assess all actions as to their environmental impacts and mitigate those impacts to the degree that is reasonable and implementable.

The authority to include stipulations on non-federal lands and the enforcibility of these stipulations are discussed in a memo of April 11, 1975 from the Denver Regional Solicitor, U.S. Department of Interior. Excerpts from that memo follow.

"The Federal Government not only can but must take whatever action is necessary to insure that Federal lands are used in an environmentally acceptable manner. To do so it must insure activity on Federal lands do not cause nonacceptable environmental impacts off as well as on the lands. Specifically, in connection with the Strontia Springs Diversion Dam it is our opinion that the Federal Government should not grant a right-of-way for the impoundment of water on Federal lands if the off tract impacts such as might result from the construction of the necessary distribution system will result in nonacceptable environmental impacts. One way to insure that such off-site impacts do not occur would be to include in the right-of-way grant stipulations controlling off-site activities.

"with respect to your question as to how such stipulations can be enforced, the right-of-way should include a provision for the forfeiture of the right-of-way if the entity to which the right-of-way is granted fails to comply with any environmental stipulations."

3. Comment. "Enlargement of existing facilities should not be dismissed lightly even if the capabilities for enlargment [sic] are not great. The maximum extent to which existing treatment plants can be enlarged should be specified and appropriately supported."

Commenter 42

Response. See discussion in Chapter 1 of the FES on Purpose and Need for project. (a) The ability of the DWB to treat raw water will be increased by 24 percent with the Foothills plant at 125 mgd and by 96 percent with the plant at 500 mgd; (b) the DWB has expanded the existing treatment facilities at Marston and Moffat over the past twenty years. Their respective locations, land area available, relationship to available water supplies, and the pumping energy required to distribute treated water are disadvantages which the Foothills Project does not have and, as a result the DWB, is not considering such expansion as a viable alternative; (c) actual usage of treated water can be reduced in the future if increasingly more severe restrictions during peak-use periods are imposed on a permanent basis. No thorough analysis of maximum extent to which existing treatment facilities may be expanded has been undertaken.

4. Comment. "Page 3-61. 'The impact (on roads) of construction for the second conduit would be greater, but this is not quantifiable. - If impacts are quantifiable for other conduits why not this one?'"

Commenter 69

Response. The impact on roads for the second conduit would be greater because of assumed undefinable increased traffic volumes on those roads in the future.

5. Comment. "Page 8-20. Under the discussion of Conduit 27, since it is not presented elsewhere, the disruption caused by conduit construction should be included. Is there adequate highway right of way for multiple use or will the conduit enter Chapel Hill Cemetery property? Also, Orchard Avenue and Happy Canyon Road should be included in Table 2-29."

Commenter 69

Response. Detailed discussion is presented in Chapter 3 under the various environmental subheadings of the impacts of the first and second conduit construction. The highway right-of-way will be adequate. The conduit will not enter the Chapel Hill Cemetery. Table 2-29 has been removed from this FES.

6. Comment. "Within a few decades, the total capacity of DWB water storage will begin to decline and will eventually disappear without extensive maintenance and renewal which are not discussed in the DES."

Commenter 69

Response. Overall maintenance of the DWB water storage system is not a factor presented as part of the Foothills Project proposal and therefore was not discussed in the statement.

7. Comment. "The possibility of wetlands and mud banks resulting from water diversion. Vector control surveillance should be maintained in these areas."

Commenter 41

Response. The possibility of wetlands and mudbanks is conceivably possible. The drawdown at Dillon would occur with or without Foothills, however.

8. Comment. Two respondents submitted comments similar to the following comment: "The present DES is extremely deficient, since it fails to provide a thorough assessment of the impact of the full 500 mgd facility. Neither the primary nor secondary impacts of the 500 mgd facility are adequately identified and evaluated.

Commenters 48 and 69

Response. The statement does reflect a thorough assessment of the impacts (both primary and secondary) at 500 mgd within the project area as defined in Chapters 1, 2, and 3. No thorough asessment is possible of the 500 mgd development beyond the project area because no specific methods of raw water delivery have been proposed by the DWB. In Chapter 8 of the statement, the three most likely concepts of raw water delivery are discussed in general terms. All three of these future concepts would involve a federal action and additional environmental assessment.

9. Comment. "It is our understanding an error was made in drafting the statement as it relates to the power production and savings as it relates to the 500 million gallons per day plant. Actual figures for the 500 million gallons per day facility would be 63.8 million kilowatt hours saved (in lieu of the 47.9 million) and a production of 28 million kilowatt hours (in lieu of 78 million) for a surplus of and savings total of 78.8 million kilowatt hours (not 111.9). This would approximate service to 14,379 homes; again with no energy production increase necessary by the Public Service Company."

Commenter 203

Response. The 78 million kilowatt-hours is incorrect; 28 million is the correct figure. Changes throughout the text have been made to reflect this and the change in savings.

10. Comment. "Page 2-5: COMMENT: The description of the existing system is incomplete in that it totally ignores teatment and operational constraints which dictate system operation.

"All tables and calculations which use these volumes should be changed to reflect useable storage only."

Commenter 74

Response. At the time of preparation of the DES, it was not clear what part operational constraints would play in system operation. Levels of 520 mgd existing treatment capacity plus some use of treated water storage were utilized throughout the text in all water calculations. These calculations show significant max-day treatment inadequacies (see Table 1-5, Chapter 1, of this FES). To turn from these calculations at this point and recalculate again all data based on these late date system constraints would cause an almost total rewrite of the ES. The shortages shown are severe with existing calculations. Any further increases of these shortage days would not appreciably increase the already severe horticultural impacts. It would appear to be unreasonable as well as untimely to begin a total recalculation just to show an increase in the degree of severity of the shortage. The FES has retained the DES calculations.

11. Comment. Two respondents submitted comments similar to the following comment: "In the left-hand column, the impacts of the 125 MGD plant are listed, yet under the right-hand column where the impacts of the 500 MGD plant are to be listed, the reader is greated [sic] by blank spaces indicating that 'no impact could be assessed.'

The purpose of this DEIS is to analyze the benefits and costs of Foothills at a 500 MGD level. This is simply not done."

Commenter 75 and 99

Response. Table 3-16 of the statement as presented was confusing. The blank spaces did not represent lack of impact assessment by the drafters of the statement; however, they were intended to show that actually no impacts were occurring; i.e., the 500 mgd development would not "re-impact" the canyon, the dam would have already been in place at the 125 mgd development stage. The format of all impact tables (including Table 3-16) has been changed throughout the statement to eliminate this confusion.

12. Comment. Several respondents submitted comments similar to the following comment: "There is one long-term impact which conceivably is of extreme importance which is not touched upon to the slightest degree. This is the set of problems which will be encountered when the Foothills plant and dam are no longer operable 75 years hence."

Commenters 42, 66, 69, 74, 104, and 129

Response. The 75 years referred to in the document is only a planning period in which by known engineering standards the project would be operable at designed standards for 75 years. However, with proper maintenance and redevelopment work, the project components could conceivably last indefinitely.

13. Comment. "The Bureau of Land Management should closely coordinate its efforts on the final EIS with the Forest Service in their Land Use Plan and EIS in order to effect a complete and valid study of the situation in the Williams Fork Valley and surrounding areas where the Denver Water Board will in the future attempt to develop its water rights."

Commenter 46

Response. The expansion of the Williams Fork System will involve a federal action and therefore would involve federal environmental coodination through the NEPA process at that time.

14. Comment. "There is no mention of the possibility for improving and upgrading the Kassler treatment plant. It seems to me that this could eliminate the need for a new Foothills treatment plant and expensive tunnel between Strontia Springs Dam and the Foothills plant."

Commenter 132

Response. According to DWB, this possiblity was studied in detail; it was determined infeasible because of the inappropriateness of the site in providing gravity flow water to the DWB service area and the diversion capability needed.

15. Comment. "But, this unique and valuable resource would be completely and irretrievably destroyed by the proposed project. Also, the north and south forks of the South Platte upstream from Waterton Canyon are highly valuable in their own right, and these would also be destroyed, ultimately destroyed by the proposal. But, none of this is included in the DES."

Commenter 100

Response. The inundation of 1.7 miles of the 12-13 mile Waterton Canyon does not completely and irretreivably destroy this resource. The proposal also does not entail destruction of the North and South Forks of the South Platte River. Therefore, no discussion of the destruction is included in this statement.

16. Comment. "I submit that there is sufficient prima facie evidence in the report, in the absence of detailed information on the plan itself, to suggest that the ultimate planned capacity is, in fact, in the neighborhood of 700 mgd. The EIS is deficient because it does not even purport to discuss the impacts involved with a plant and treatment of this capacity."

Commenter 214

Response. The DWB has stated the ultimate capacity of this project to be 500 mgd. All plans and detailed data discuss the 500 mgd capacity. This is the degree for which that federal action has been requested by the applicant; therefore this is the degree to which the environmental impacts have been assessed.

17. Comment. "The environmental effects of Foothills between Cheesman dam and South Platte, and from the East portal of the Roberts Tunnel and South Platte are woefully inadequate in the Report. The complete channelization of the North Fork will have great impact on the people living in and using that area. The South Fork stream flow conditions during and after construction are not spelled out. The present recreational uses of the South Ford [sic] are presented in a very negative way and leaves [sic] the impression that any alteration of the area would be for the better should Foothills be built."

Commenter 145

Response. Channelization of the North Fork is an ongoing DWB project and was not a part of the Foothills proposal. Annual flows at 125 mgd development level will be no different than they would be without the project. Flows at the 500 mgd level are undeterminable due to the fact that no specific raw water development has been proposed by the DWB at this time. An array of these raw water concepts is discussed in Chapter 8. The discussion of recreation on the South Fork has been revised.

18. Comment. "For the 500 mgd treatment plant, the statement did not cover the potential for hydroelectric power generation in the future at different sites between the Dillon Reservoir and the Stronta Springs Dam. For example, at the east portal of Roberts Tunnel, a power plant with a capacity of 16 MW can generate 96 million KWH/year. Other sites for potential power generation include Crossons and Two Forks. This power is in addition to the power generated at the terminal point of Conduit No. 26 and utilizes the same water as it flows downstream from Dillon to the Foothills Treatment Plant."

Commenter 156

Response. These power potentials may exist but were not part of the applicant's proposal; therefore, they were not covered in this ES.

19. Comment. "I-31 Paragraph 1 - It is questionable whether or not the identified aggregate site will be sufficient to meet all construction needs. It seems appropriate to discuss a secondary site and the potential impacts associated therewith."

Commenter 85

Response The contractor presently leasing the proposed aggregate site has stated to the DWB that there is more than sufficient quantity of material at the aggregate site to meet the material needs for the Foothills Project construction.

20. Comment "The next EIS must explicitly correct the many misleading statements which have been issued by DWD representatives."

Commenter 42

Response The ES may only address the Proposed Action as provided in the written permit application.

21. Comment "Re: Assumption #3. NEPA and BLM guidelines require identification of the relation between short-term uses and long-range productivity of the human environment. The impact of the project facilities on the human environment beyond their useful lifetime also needs to be identified and evaluated."

Commenter 69

Response There is no practical method for analyzing these impacts which may occur 75 or more years in the future because future use of the site cannot be reliably predicted at this time. Possible actions would include plant modernization and continued use, removal of plant and dam, and removal of only the plant.

22. Comment "Page 1-3, Map 1-2: The Platte Canyon access road from the present Platte Canyon intake upstream to the so-called Keystone Bridge is shown on the map as being a 14 foot road with turnouts including power and telephone lines. This segment of the Platte Canyon access road should be proposed for improvement to 22 feet to comply with safety considerations."

Commenter 74

Response The map has been revised in the FES. See Chapter 1 at the end of the chapter.

23. Comment "Page 3-8, Paragraph 6: Since the figure 3-1 which is referenced in this paragraph is the subject of extensive comment hereinafter, this paragraph will need either revision or removal in order to respond to the comments hereinafter state."

Commenter 74

Response The comments addressed later in commenter's letter were addressed later in other comments.

24. Comment "Page 3-53: The Final Statement should discuss the alternate routes for this utility line which have been disucssed [sic] with the U.S. Forest Service by the Public Service Company. In all probability the poles will not be adjacent to the roadway."

Commenter 74

Response Field trips were made and various discussions occurred in the fall of 1977 between DSC and BLM/USFS personnel concerning alternate routes for the utility lines in Waterton Canyon. To date, no amendment detailing alternate routes to the proposed has been made. The impacts are assessed in Chapter 3 of this FES on the basis of a pole line route along the access road; mitigation measures are offered in Chapter 4 of this FES on the basis of that same route. In Chapter 8 of the FES a minor alternative, Underground Powerlines and Telephone Lines, is offered which is also assessed as being located in the access roadbed.

25. Comment "The final statement must then discuss this proposal in greater detail to emphasis [sic] how absurd such a proposal is by pointing out the outlandish costs involved in burying those lines as against the relatively insignificant costs of stringing them on

environmentally compatible poles, as suggested in the current mitigating measures section."

Commenter 74

Response As discussed in Chapter 8, Minor Alternatives section. The increased cost of burying the lines versus stringing them on poles is estimated to be approximately $500 to $600 thousand. The effectiveness of this required burying is detailed in Chapter 4. No text changes were made in the FES to show this cost.

26. Comment. "Page 5-19, Table 5-6, SUMMARY TABLE OF ADVERSE IMPACTS WHICH CANNOT BE AVOIDED: This table is the most biased summarization effort in the Draft Environmental Statement! It dramatically demonstrates the bias of either the author or the editor. Possibilities are transformed into certainties, temporary disturbance of land is transformed into permanent loss, subjective opinions are transformed into fact, and inflamatory adjectives are used to distort an impact.

Commenter 74

Response Table 5-6 of the FES has been reassessed for its objectivity and has been found to accurately portray the adverse impacts which cannot be avoided. The table has been changed to better reflect the residual effects of the project.

27. Comment. "Page I-31, Paragraph 5: The description contained herein of the water turnover at the reservoir can be further refined in accordance with attachment 4 hereof."

Commenter 74

Response This paragraph retained in this FES clearly explains the water turnover at the proposed Strontia Springs Reservoir. It is felt that there is no need for any additional in-depth discussion of this element of the proposal because it does not reflect on the adequacy of the environmental assessment of this proposed project.

28. Comment. "The omission of information in the DEIS in areas such as recreation and air pollution affects many diversities which makes it difficult, if not impossible, for the citizen to form an opinion based on fact."

Commenter 148

Response The text has been rewritten and expanded throughout the final statement for both recreation and air quality.

29. Comment. ". . . there is a noticeable deficiency of detail on the Denver Water Board treated water system. On Page I-20 only a brief mention is made of operation advantages resulting from the elevation of the Foothills plant. Although shown graphically in Figure 1-1, this reduction in pumping should be further explained. The relationship between Foothills and the existing Denver Water Board distribution system needs more explanation. It should be pointed out that all of the recent major transmission facilities installed by the Denver Water Board have been designed and sized to accommodate water from the Foothills plant."

Commenter 171

Response The major distinct advantage is discussed under the Purpose and Needs section of Chapter 1 of the FES. Specific discussion concerns a large amount of the present pumping that may be reduced by the development of the Foothills Project. This discussion and figure 1-1 is considered to be adequate coverage of the subject.

30. Comment. "The issue of segmentation of the proposed project which caused revision of the original Environmental Statement has not been resolved in the new DES. The DES fails to demonstrate clearly whether the 125 mgd treatment facility is considered by BLM and DWB to be functionally and economically a self-sufficient project or is inextricably linked to expansion to a 500 mgd facility. The comments from statewide review of the previous DES (March 1, 1976) showed the development of the 125 mgd facility alone to not be cost effective. The DES also does not adequately show where and for what purposes the additional 500 mgd facility will be utilized. The ruling of the Regional Solicitor of July 8, 1976 states that '. . . limitation (of study of impacts) to 125 mgd is a serious error which significantly underestimates the potential impacts of this proposed action.' As such, the present DES is extremely deficient, since it fails to provide a thorough assessment of the impact of the full 500 mgd facility. Neither the primary nor secondary impacts of the 500 mgd facility are adequately identified and evaluated. The status of the water resource 'concepts' discussed in the DES is vague and ambiguous, and the assessment of these additional developments fails to discuss the full range of probable effects, especially secondary impacts. The statement that additional federal actions would each be subject to NEPA requirements fails to respond to the contention that federal approval of the Foothills Project would create a commitment to, or prejudice in favor of, further federal actions required for the development of water resources needed to justify the existence of the 500 mgd facility. The evaluation of additional sources of raw water and their environmental impacts cannot be divorced from the Foothills decision, since three fourths of the Foothills Project capacity is useless without additional raw water."

Commenter 69

Response This FES has been written for the Foothills Project for both a 125 mgd and 500 mgd development level. Environmental impacts have been assessed on both levels in the FES. The impacts of the 500 mgd as it relates to needed raw water are discussed in the Raw Water Alternatives section of Chapter 8 in this FES. These raw water discussions are general in nature because no particular raw water concept has been chosen or proposed at this time. At such time as a particular concept is proposed by DWB, all NEPA requirements would be met due to the fact that all the concepts involve a federal action. Additional raw water would have to be developed by 1988 with the project.

Appendices

APPENDIX 1.

Foothills Ecology Project: The Bighorn Sheep of the South Platte

By

Richard E. Jones and Christine C. Jones

I Introduction

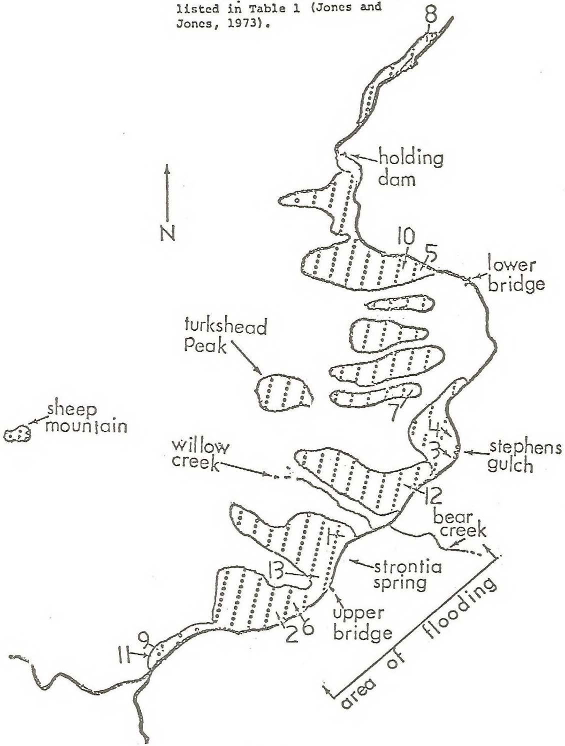
In late May, 1973, we were assigned the task of investigating a herd of Bighorn Sheep in the South Platte Canyon, Colorado. Proposed construction of the Turkshead and Two Forks dams in this canyon produced an urgent need for information on the number of sheep in the canyon and their population structure, home range, food habits, habitat usage and general condition.

Our observation extended from late May, 1973 to late June, 1974. We feel that the information gathered on this herd is preliminary but reliable, and will be of help in caring for the sheep as human disturbance invades their domain. This final report includes 1) a summary of the findings of our previous reports (Jones and Jones, 1973, 1974a, 1974b), 2) some new observations, and 3) conclusions on the management and protection procedures that should be instigated to ensure the welfare of this herd.

Our study of the sheep centered upon an area which extended from the mouth of the South Platte canyon (at the Denver Water Board entrance gate) up the South Platte River about 10 miles to the upper gate. The canyon walls in the upper reaches of the study area (above the upper bridge) are very steep and consist of rocky outcroppings interspersed with grasses, forbs, and conifers. The canyon walls below Strontia Spring are less steep, in most places, and there are fewer conifers. Rocky outcroppings interrupt the undulating canyon walls in some areas (Fig. 1).

Most of our observations of the sheep were made by driving the canyon road and observing the sheep with binoculars. Two helicopter flights over the canyon helped us locate the sheep at certain seasons when they were difficult to sight by car or on foot. Observations passed to us by other scientists with the Foothills Ecology Project and by

Figure 1. [illegible]
Hatched regions indicate steep, rocky topography. Numbers refer to localities of sheep sightings listed in Table 1 (Jones and Jones, 1973).



Denver Water Board Personnel were of great help.

II. Sheep usage of canyon

A. Summer

Observations in the summer of 1973 and 1974 indicate that the sheep use the upper reaches of the canyon, immediately below the lower bridge to the upper gate, at this time of the year. Most of the sheep prefer the NW and W side of the river, frequenting the steep, rocky slopes extending to the water's edge. They seem to avoid stands of conifers. Older rams remains separate from the ewes, yearlings and lambs at this time of the year.

B. Winter

In the fall, the sheep move down the canyon to areas I-IV described in Fig. 2. These areas make up the major wintering ground of this herd. They consist of steep, rocky, ridges extending to the river. These ridges alternate with steep, brushy canyons. The herd, now consisting of all sexes and ages, remains on this wintering ground during breeding activities.

C. Spring

In late March, the older rams move up the canyon and the pregnant ewes retreat to a high rocky ridge above the lower bridge and near Turkshead Peak. Fortunately, this area is not susceptible to human disturbance.

D. Usage of the E and SE canyon walls

As mentioned, most of the sheep were observed on the NW and W side of the canyon. Only rarely did we see sheep on the E or SE canyon walls. In the winter, one small mixed group was observed near the small holding dam, 1.8 miles up the canyon from the lower gate (see Fig. 2). In late summer, 4 ewes were seen on the SE side of the canyon near the upper

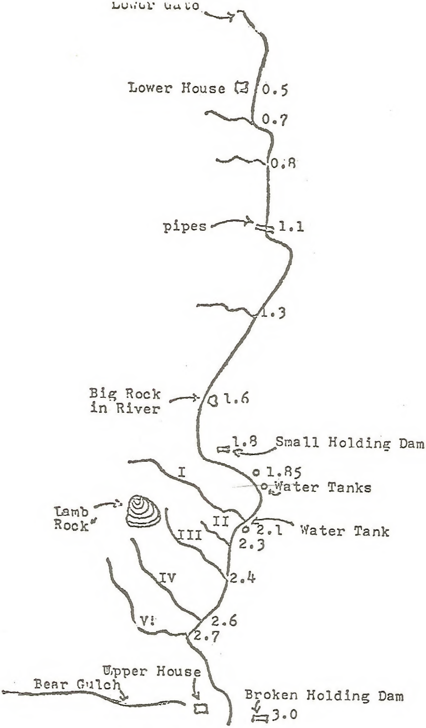


Fig. 2. Rough map of wintering area. Numbers refer to miles from lower gate. Roman numerals refer to gulches that descend from "Lamb Rock" to road. Major sheep wintering area is in gulches III and IV and their intervening rocky ridges.

bridge. It is difficult to determine if 1) these sheep crossed the river and are part of the South Platte Canyon herd, or 2) they wandered into the canyon from the herd located to the south near Roxborough Park. At any rate, very few sheep use the E and SE canyon walls, probably because of less sun exposure and fewer rocky outcroppings.

III. Herd Population Size and Structure

Moser (1962) counted 13 rams and 36 females, lambs and yearlings in Nov., 1955 in the South Platte Canyon. In 1962, he estimated this herd at 50 animals. Charles Hector (Cited by Bear and Jones, 1973) estimated the canyon herd to number about 18. Therefore, a drastic reduction in herd size occurred between 1962 and 1970. Discussions with residents of the area indicate that this loss of sheep was mainly due to poaching by workers building the lower holding dam. Since 1970, the herd, through lamb recruitment and protection against hunting, has increased rapidly to our estimate of 35 sheep in 1973 and 1974.

On March 3, 1974, we observed a mixed group of 27 sheep, including 4 lambs, 2 yearling females, 7 ewes, 1 yearling male, 5 2-3 yr males, 4 3-6 yr males, and 4 5-8 yr males with no males over 8 yr being present. The absence of old rams probably reflects the aforementioned illegal poaching in the 1960's. These data suggest a present ram:ewe ration of about 185:100, and a lamb:ewe ration of about 57:100. The latter ratio indicates that about 1/2 of the lambs born suffered post-natal mortality. However, observation of ewes in May, 1974, indicate that only about 4 ewes were pregnant (out of about 15 ewes total). Therefore, disturbance of breeding activity may have effected pregnancy rate. Of these 4 ewes, only 2 gave birth to surviving lambs, as indicated by our second helicopter survey. In general, we feel that the herd is growing at a rate of about 1-3 sheep per year, assuming a dominance of natality over mortality.

IV. Disease problems

In 1958, Pillmore (1959) examined lungs of 6 sheep from this canyon and found that all contained lungworm infection. We have found lungworm larvae in most feces samples collected, and also have observed symptoms of lungworm infection (coughing, rough coat) in 2 ewes in the herd. Transmission of lungworm is most prevalent in a crowded situation, and we feel that overcrowding of the sheep on the small wintering ground is a potential if not overt health hazard to the sheep.

V. Food habits and habitat impact

The sheep in the canyon graze on grasses and forbs and browse on shrub species (see our 1973 report for identification of plants utilized). Food availability is not a problem on the summer range, but the small wintering area exhibits heavy impact from sheep usage. We believe that the herd is at maximum size in relation to the carrying capacity of this winter range.

VI. Competition from other species

Competition from other ungulates does not seem severe. Domestic cattle and sheep do not graze in the canyon. Elk occur in the area from October to April, and deer are present all year (Bear and Jones, 1973). We observed several deer competing with sheep for browse on the wintering ground, and this competition may have a slight negative effect on sheep welfare at this time.

VII. Hunting

According to Bear and Jones (1973), the South Platte herd was hunted for 13 consecutive years, from 1954-1966. Out of 92 liscenses issued, 43 rams were killed, indicating a very high hunting success of 47%. This high success was almost certainly due to the accessibility and tameness of this herd. Apparently, legal hunting was stopped in 1967 because of the drastic reduction in herd size due to illegal hunting.

We understand that at least one bow-hunting permit has been issued for the 1974 season, so it appears that hunting of this herd at a low level is present Game and Fish policy. We consider this a healthy policy, because we believe that the herd should not be allowed to increase above its present number. However, we also believe that, along with legal hunting of only one sheep a year, all means of enforcement should be employed to prevent poaching, especially by workers on the proposed dams.

VIII. Predation

Some of the post-natal mortality of lambs is almost certainly due to coyote predation. Coyotes are numerous in the canyon. Also, the few mountain lions in the canyon may take a few sheep. However, we feel that predation is a natural limiting factor, and one that should be maintained. In 1974, the Game and Fish Department hired a trapper to remove some potential predators on the sheep (e.g., coyotes, bobcats). Apparently, (hearsay) this was based on the observation that, although 5 lambs were present in the summer of 1973, only one was present in the winter of 1973. However, our careful search revealed that at least 4 of the 5 lambs survived their first winter.

IX. Human disturbance

We were impressed with the amount of harassment of the sheep by people during the winter. The sheep wintering-breeding ground is near the road, and readily accessible to hikers, photographers, etc. We are sure that the normal breeding activities were at least slightly disturbed by human intrusion. This sould be kept to a minimum. Legitimate scientists and photographers should be allowed access to the slopes of the canyon only by written permission. Other people interested in observing the sheep breeding behavior should be allowed to do so only from the road.

The activities of men and equipment during dam construction should be planned to 1) avoid disturbance of the sheep when breeding, and 2) avoid physical damage to the wintering area. Seasonal movements of the sheep should not be impeded by construction work. Other disturbance, such as harassment of the sheep by the many helicopters used in relation to dam construction, should be avoided.

X. General discussion and conclusions

The trend of Colorado Bighorn sheep populations is consistently downward. In 1915, there were 7,230 sheep in Colorado; whereas there were 3,200 in 1958 and 2,200 in 1970 (Bear and Jones, 1973). The South Platte Canyon herd offers some unique opportunities to study this endangered species. According to George D. Bear, sheep expert for the Colorado Game and Fish Department (letter of April 29, 1974) "This herd is indigenous to the area. I believe it was historically part of the Mt. Evans herd. As you might note, there has been little work done on the herd." The knowledge obtained from our study is the most thorough available, but more information is needed. For example, we must know if the range of the herd extends up the canyons of the north and south forks of the South Platte River. Also, the herd physical condition, size, sex and age structure, and movement patterns must be monitored during and after construction of the proposed dams. Only then can appropriate management adjustments be made to ensure survival of the sheep in this canyon.

The accessibility of this herd offers a unique opportunity for biologists to study in detail the ethology and ecology of this species, and offers the public a chance to observe at close range a remnant of our wild heritage. We feel strongly that public observation of these animals, without disturbing them, will be of great benefit. It is a poor soul that is not increased in environmental awareness by the experience of contact with these animals.

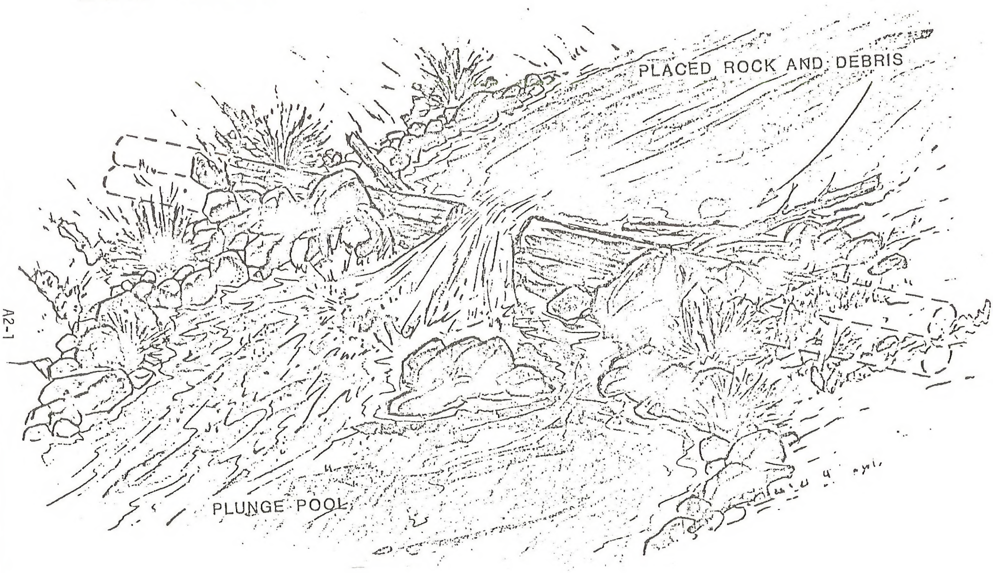
APPENDIX 2.

Examples of a Stream Improvement Program

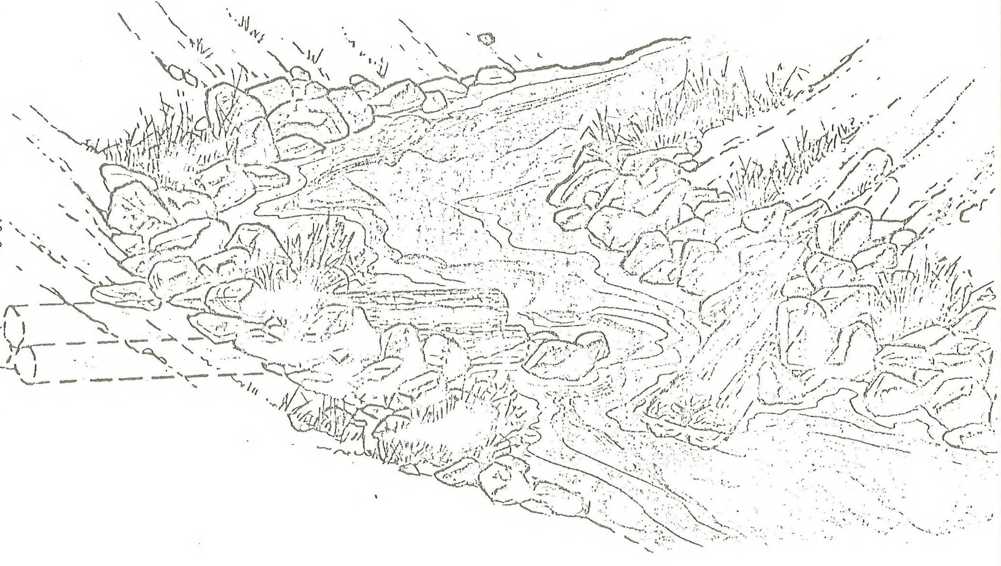
Joint report of the Colorado Division of Highways, the U.S. Forest Service, and the Colorado Division of Wildlife.

(Design by Colorado Division of Highways for Eagle River between Eagle and Gypsum. Required to accommodate a segment of Interstate 70. Structures were designed to develop pools and meander channel. Structures were designed to withstand wide variation in flows and would be suitable for the South Platte River below the South Platte Intake . . . DOW)

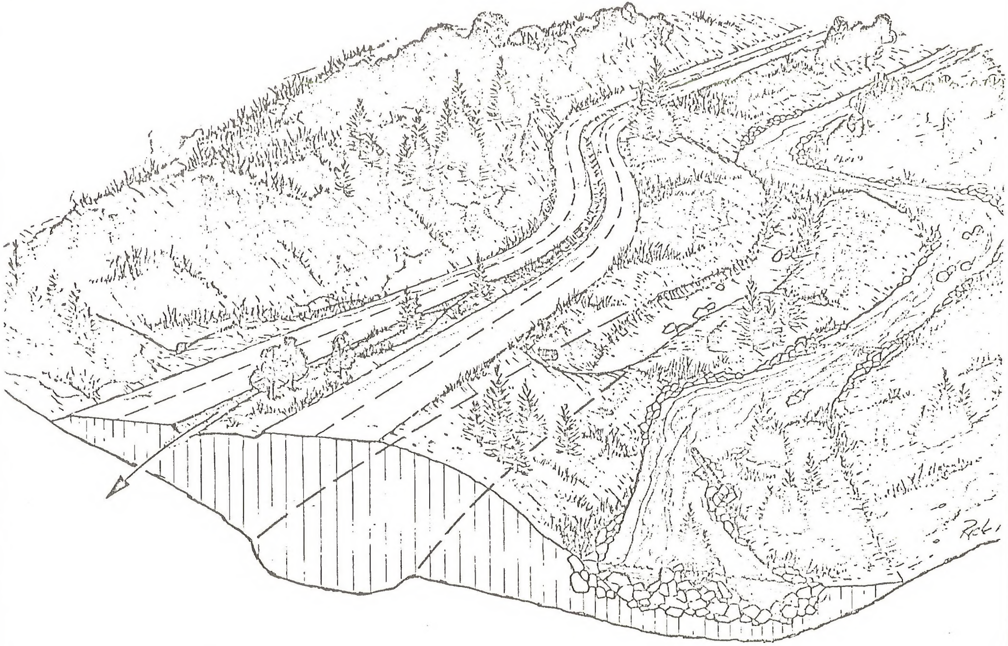
LOG WEIR



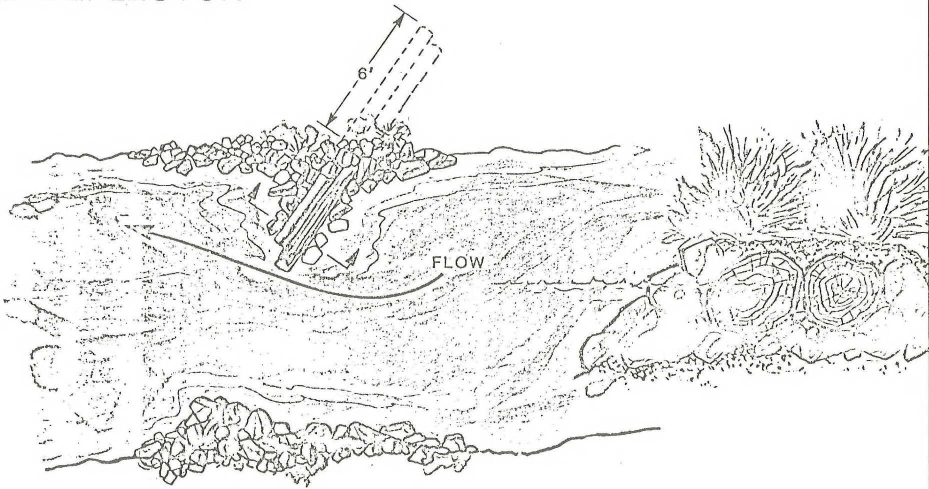
DEFLECTOR CONFIGURATION



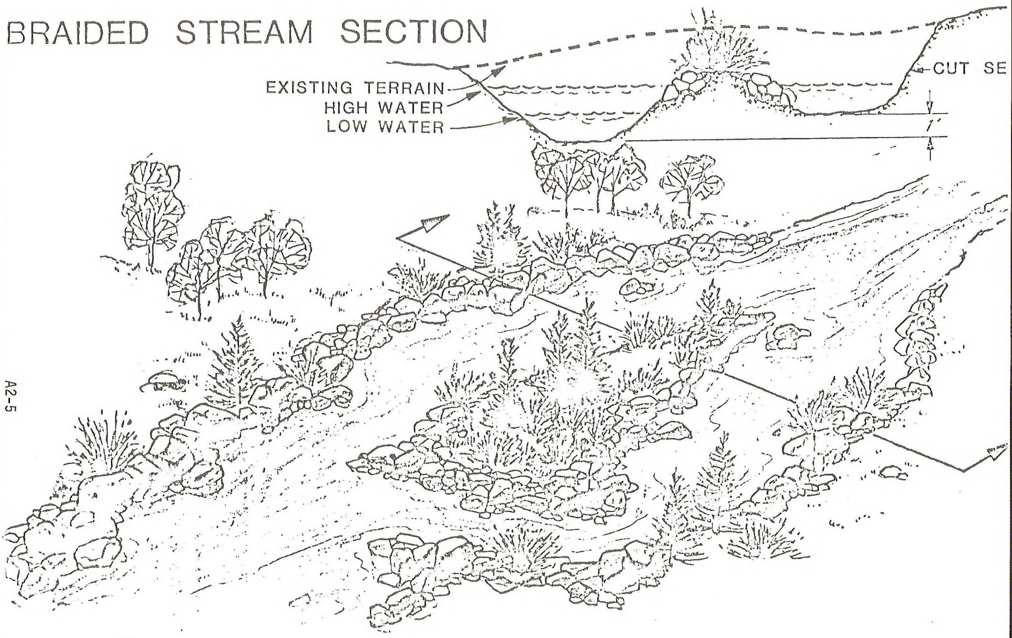
OVERALL CHANNEL CHANGE LANDSCAPE INTEGRATION



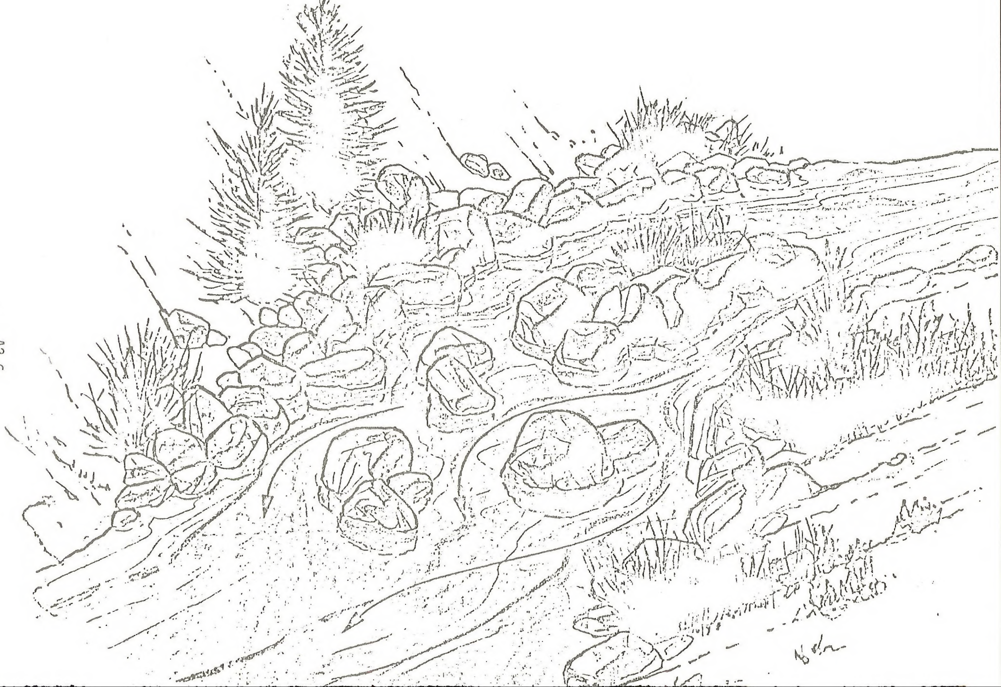
LOG DEFLECTOR



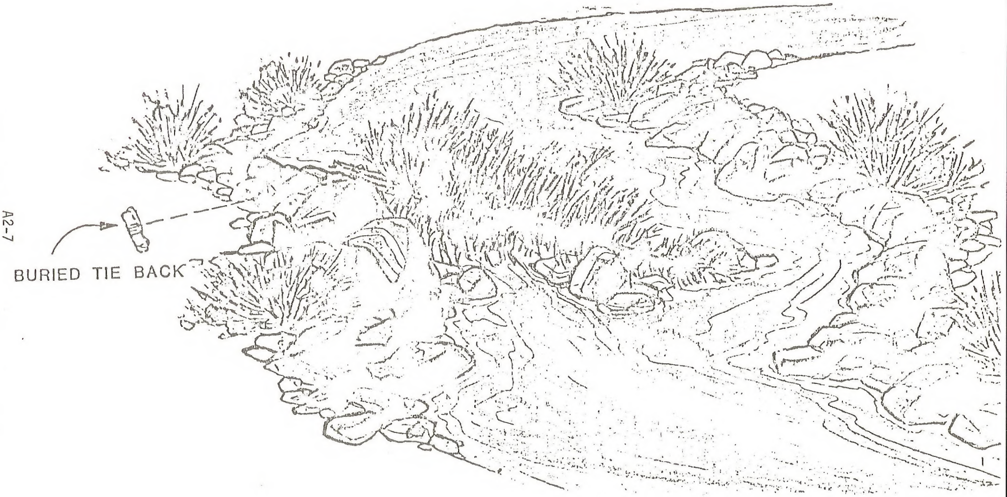
BRAIDED STREAM SECTION



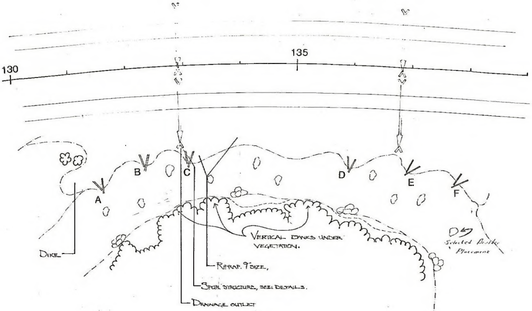
RANDOM ROCK PLACEMENT



FALLEN TREE DEFLECTOR



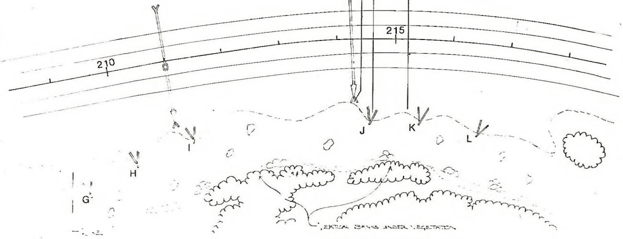
[illegible]	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
VIII	COLORADO	I 70-2(10)	[illegible]	


130
135
A
B
C
D
E
F
Dike
Vertical banks under vegetation.
Riprap. 9" size,
Spur structure, see details.
Drainage outlet
Selected Boulder Placement

SPUR LOCATION

STATION	DISTANCE RIGHT
A-131+42	- 195'
B-132+20	- 165'
C-133+00	- 165'
D-135+94	- 175'
E-137+04	- 175'
F-137+93	- 193'
G-209+53	- 194'
H-210+24	- 156'
I-211+26	- 135'
J-214+58	- 136'
K-215+46	- 134'
L-216+61	- 150'

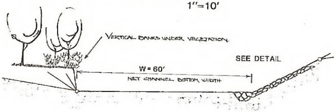
EAGLE RIVER
Channel Changes



[illegible]	DIVISION	PROJ. NO.	[illegible]	[illegible]
VIII	COLORADO	I 70 - 2(10)		

TYPICAL CROSS-SECTION

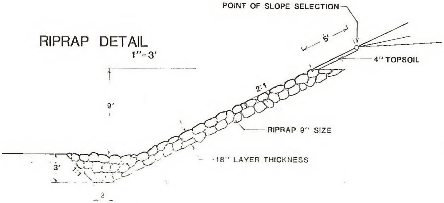
1"=10'



EAGLE RIVER
Channel Changes

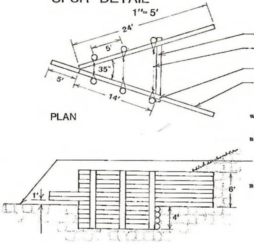
RIPRAP DETAIL

1"=3'



SPUR DETAIL

1"= 5'



ELEVATION

HORIZONTAL MEMBERS ARE TO BE 11' LONG.

1/2" GALV. WIRE CABLE & CLAMPS. (3 CABLES PER POST, SPACING AT 2' INTERVALS BEGINNING 18" BELOW TOP LOG.)

ATTACH EACH HORIZONTAL MEMBER TO UPRIGHTS WITH 1/2" BOLTS.

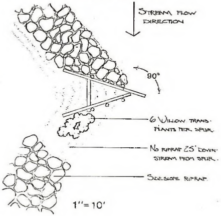
TIMBER SHALL BE UNTREATED LOGS (8" MIN. DIA. FOR HORIZONTAL MEMBERS; 12" MIN. DIA. FOR UPRIGHT MEMBERS). NO JOINTS WILL BE ALLOWED.

- INSIDE OF SPUR SHALL BE LINED WITH A FABRIC FILTER BLANKET (SIDES AND BOTTOM).
- BACKFILL MATERIAL SHALL BE ROCK FILL WITH 4" OF TOPSOIL AT THE TOP.

REFERENCE ELEVATION SHALL BE THE STREAM FLOWLINE PROFILE SHOWN IN PLANS.

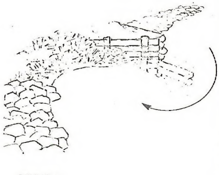
- ELIMINATE RIPRAP TOE TRENCH FOR 10' ON EACH SIDE OF SPUR.

SPUR TREATMENTS


STREAM FLOW DIRECTION
90°
6 WILLOW TRANS-PLANTS PER SPUR.
NO RIPRAP 25' DOWNSTREAM FROM SPUR.
SIDESLOPE RIPRAP.

1"= 10'

PLAN



SKETCH

APPENDIX 3.

U.S. Fish and Wildlife Service's Updated Report in Compliance with Section 662 of the Fish and Wildlife Coordination Act

DEPT OF INTERIOR
BUR LAND MANAGEMENT
COLO STATE OFFICE, DEN[illegible]
[illegible] AUG [illegible]

910

United States Department of the Interior
FISH AND WILDLIFE SERVICE

MAILING ADDRESS:
Post Office Box 25486
Denver Federal Center
Denver, Colorado 80225

STREET LOCATION:
10597 West Sixth Avenue
Lakewood, Colorado
Across From Federal Center

IN REPLY REFER TO:
FA/SE/Falcon, American peregrine
Coop.--BLM--Strontia Springs Reservoir

AUG 5 1977

MEMORANDUM

To: State Director, Bureau of Land Management,
Denver, Colorado

From: Regional Director, Region 6
Fish and Wildlife Service, Denver, Colorado

Subject: Endangered Species Consultation--Strontia Springs Reservior

Please disregard our memorandum of July 19, 1977, on this subject (copy attached).

We have had some problems with internal communications which we hope have been corrected.

Please accept our apologies and consider this memorandum as our threshold examination response to your request for formal consultation dated May 13, 1977.

We have conducted a threshold examination as prescribed in the proposed regulations published in the Federal Register of January 26, 1977. Under these, we have a choice of three responses. These are:

In the opinion of the Fish and Wildlife Service, the program or activity

(1) Will promote the conservation of listed species;

(2) Will in no likelihood jeopardize the continued existence of a listed species or result in the destruction or adverse modification of its critical habitat; or

(3) May jeopardize the continued existence of a listed species or result in the destruction or adverse modification of its critical habitat.

We conclude that the Strontia Springs Reservoir, as now proposed, will in no likelihood jeopardize the continued existence of the American peregrine falcon or destroy or adversely modify its critical habitat.

This Project will affect only a part of a much larger area where three peregrine falcon eyries are located. This area, including adjoining hunting habitat, has been legally described and submitted to our Director as recommended essential habitat. The total area contains 204,800 acres, more or less. This area provides ample nesting opportunity; however, the prey base is rather sparse, resulting in the utilization of a significant area for feeding.

The specific eyrie of concern, relative to the Strontia Springs Reservoir, is the Cathedral Spires location. According to the Colorado Division of Wildlife, the site was first discovered sometime in the mid to late 1960's. This site has had a history of use and the pair of falcons has had above average productivity while most of the other wild sites have been gradually failing. For your information we have attached a summary of use and productivity of this site prepared by our Salt Lake City Area Office.

Construction of Strontia Springs Dam and Reservoir would not impact the eyrie. Our concern was with the high flows scheduled for the North Fork of the South Platte River when operated at maximum levels, 500 million gallons per day, and their impact on riparian vegetation. Severe impact on this vegetation would affect the prey base, which consists of small birds, and could therefore have an adverse impact on the adult peregrines and young of the year utilizing this feeding area.

Denver Water Board projections indicate that under extreme flows (maximum) eighty-four acres of riparian vegetation in an area along the North Fork between Bailey, Colorado and the confluence of the North Fork and South Platte River will be flooded. This is expected to occur only once in every ten years for periods of from 3-5 days. Flooding will take place in those areas of low gradient which will reduce the eroding action on native vegetation.

We conclude these rare inundations will not reduce peregrine prey. However, any further modification proposals such as channelization and construction of other impoundments in this area would require additional evaluations.

Finally, we wish to commend you on actions taken to sustain an active eyrie by closure of the critical area, cooperation with and funding of the captive propagation unit and your close cooperation with the Colorado Division of Wildlife in the management of the endangered peregrine falcons on Bureau of Land Management administered lands. We feel certain if all agencies would support this recovery effort as you have done recovery objectives would become much more of a reality.

Harvey Willoughby

Attachment

cc: Area Manager, Salt Lake City

	Surname	Date
AUTHOR	Hamilton	7-18-77
SR. STF. BIO.	Davi	7-18-77
A R D	Lunn	7/18/77
DIV SECY.	[illegible]	7/18/77
COORD OFCS		
S D	Pass	7/19/77
E A		
D R D		

/SE/Falcon, American peregrine
Coop.—BLM

MEMORANDUM

19 JUL 1977

To: State Director, Bureau of Land Management
Denver, Colorado

From: Regional Director, Region 6
Fish and Wildlife Service, Denver, Colorado

Subject: Strontia Springs Reservoir (your May 13, 1977 letter
CO-933, 6522.11)

We are uncertain whether your letter of May 13, 1977, to us on this subject meant to request a formal consultation as provided in the proposed "Provisions for Interagency Cooperation" (Federal Register January 26, 1977,) or to continue the informal consultation process in which we have been involved. Initially we interpreted it as a request for formal consultation but have now decided you intended only to continue informal consultation. If we are wrong, please let us know and we will proceed with a threshold examination.

We appreciate your keeping us informed on your plans for protecting the American peregrine falcon and southern bald eagle and their habitats in this area.

/s/ Harvey Willoughby

cc: Area Manager, Salt Lake City

SE/SHamilton:dr:7/18/77

HISTORY OF USE AND PRODUCTIVITY--CATHEDRAL SPIRES EYRIE

According to the Colorado Division of Wildlife, the site was first discovered sometime in the mid to late 1960's. It was occupied in 1968 and 1969, but nothing is known of production. In 1970, the pair was present and apparently had produced three young. Although a pair was observed at the site in 1971 and 1972, it is not known if they succeeded in producing and fledging young.

Two young were fledged by the pair in 1973. This was the only site of eleven in Colorado with pairs that produced young that year. The pair had attempted to nest on a ledge on the southeast corner of the cliff complex, but failed during incubation. They renested and laid the second clutch on a ledge on the south side of the pinnacle and succeeded in rearing two young.

In 1974, the pair again attempted to nest on the ledge on the southeast corner of the complex, but failed shortly after they laid their eggs. They moved to an open ledge on the east face and laid three eggs which hatched. All three young fledged.

In 1975, the southeast corner was again chosen for the first nest attempt and the eggs failed. The shell fragments were removed for analysis. The pair moved several hundred yards to the west of the highest pinnacle and laid a second clutch consisting of four eggs. Since they had selected a site which was close to a trail, they were regularly disturbed by hikers. It was decided that two of the four eggs would be removed for artificial incubation and the adults would be left the other two eggs. In this way, if the adults were kept off the eggs and they should fail to hatch, the young which hatched from the artificially incubated eggs could be returned to the pair. Unfortunately, when the biologist returned with the two young which had hatched in the incubator, the adults had failed to hatch their two eggs, had abandoned the nest, and could not be enticed to return to care for the young. The young were then placed with another wild brood to be reared by other parents.

In 1976, the pair selected the western ledge they occupied in 1975 and laid 4 eggs. Two of the eggs were cracked and all were removed for artificial incubation. Two of the eggs subsequently hatched, but only one chick survived. In the meantime, the adults moved to the open ledge on the east face which they used in 1974 and laid four more eggs. The second clutch was removed as well and replaced with dummy eggs. Later, three young were hatched from the second clutch. Two young were returned to the wild pair, but after about 10 days the female disappeared and the male would not take over her duties, so the young were removed to prevent their starving and placed in a wild site in New Mexico. Thus, no young were produced at the site in 1977. As indicated by these observations the Cathedral Spires site has had a history of use and the pair of falcons have had above average productivity while most of the other wild sites have been gradually failing.

United States Department of the Interior
FISH AND WILDLIFE SERVICE
AREA OFFICE COLORADO—UTAH
1426 FEDERAL BUILDING
125 SOUTH STATE STREET
SALT LAKE CITY, UTAH 84138

In Reply Refer To (ES)

April 20, 1977

MEMORANDUM

TO: State Director
Bureau of Land Management
Denver, Colorado

FROM: Acting Area Manager
Fish and Wildlife Service
Salt Lake City, Utah

SUBJECT: C-099597, Application for Amendment to Right-of-Way for Strontia Springs Reservoir, Dam, Conduit, and Tunnel; C-22081, Right-of-Way Application for the Platte Canyon Road -- Denver Water Board

This is in response to your February 24, 1977 memorandum requesting an update of the Fish and Wildlife Services' August 20, 1975 report on the above subject. It is our opinion that the analysis and recommendations presented in the August 20, 1975 report (copy attached) remain valid.

We have since learned that two endangered species, the American peregrine falcon, *Falco peregrinus anatum* and the southern bald eagle, *Halinaeetus leucocephalus leucocephalus* are known to occur within the project area.

The peregrine falcon eyrie exists in the vicinity of the North Fork.

The birds using this eyrie are dependent upon the riparian vegetation along the North Fork as feeding grounds. Destruction or modification of this habitat could have a detrimental effect on continued success of this eyrie. The eyrie itself would not be directly impacted by the project. However riparian habitat along the North Fork was included in the Rocky Mountain/Southwestern Peregrine Falcon Recovery Team's recommendation to the Fish and Wildlife Service for critical habitat designation action.

The southern bald eagle eyrie is located on the South Fork of the South Platte. The eyrie itself will not be directly effected by the project. However, the upper part of the project may be within the feeding radius for these birds. Based on available data it does not appear that the eagles using this eyrie will be affected by this project.

Since this activity may affect a listed species, we suggest you may wish to initiate the formal consultation process as described in the enclosed proposed provisions for interagency cooperation as published in the Federal Register January 26, 1977. In this case "the appropriate official" to direct your request for a formal consultation to is the Regional Director, U.S. Fish and Wildlife Service, Regional Office, P.O. Box 25486, Federal Center, Denver, Colorado 80225.

We appreciate the opportunity to review this application.

William C. White

Attachment

APPENDIX 4

Visual Resource Management
System Procedures

Introduction

This appendix is composed of portions of BLM Manual 6300. (Visual Resource Management). In addition to the processes described by the BLM Manual, a form of symbol rotation is used on the visual resource color plates in Chapter II. The symbol is constructed as follows:

$$\frac{\text{Sensitivity-Distance Zone}}{\text{Scenic Quality}}$$

The symbol indicates the factors considered for determining the visual management class of an area. It is not a mathematical formula. For example, an area of high sensitivity in a foreground situation associated with Class B scenery would be indicated as follows:

$$\frac{\text{H-Fg}}{\text{B}}$$

6300 - VISUAL RESOURCE MANAGEMENT

.05 Definitions.

A. Visual Resource Management (VRM) is the planning, design, and implementation of visual resource management classes for all BLM resource management activities.

.06 Policy. It is Bureau policy to:

A. Plan, design, and implement its resource management activities in a manner which will minimize adverse effects on the visual resource.

B. Provide all Bureau activities with guidance to minimize adverse impacts on the visual resource.

C. Provide systematic interdisciplinary approach which will assure the integrated use of environmental design arts, and scientific practices.

D. Attain acceptable levels of visual impacts, without unduly reducing commodity production or limiting program effectiveness, by utilizing a "Design Analysis Process" for all management activities.

E. Maintain a basic and applied research VRM program, concentrating on design techniques for resource management.

.07 General Philosophy. During the last several years, the quality of our environment has become increasingly important to a large segment of our population. Since one of the major components of a quality environment is the way it appears, aesthetics is receiving more and more attention from both the public and from land management agencies. Many of BLM's land management activities involve some alteration of the natural character of the landscape. Because these alterations can change the landscape character, it is imperative that they be understood and treated in a manner that reinforces the natural character and quality of the landscape. It must be recognized that there is a variety of scenic values on national resource lands and there are numerous other resources with management objectives that may not coincide with the protection of the visual resource. These different values and objectives warrant different levels of protection for the visual resource. Because it is not practical to provide the same degree of management to the visual resources on all BLM lands, it becomes necessary to have a system to evaluate the visual resources and to determine what degree of management is desirable and practical, including protection, rehabilitation, and enhancement.

.08 Description of the System. The system is divided into three major components:

A. 6310 - Visual Resource Inventory and Evaluation: An inventory and evaluation process which provides minimum visual resource management class for all national resource lands as input to the BLM planning system.

B. 6320 - Visual Resource Contrast Rating: A visual contrast rating system to determine whether or not a proposed management practice or project will meet the visual resource management class that has been established for the area.

C. 6330 - Visual Resource Project Planning and Design: Methods and concepts for reducing the visual impact of management practices and projects in an effort to meet the visual resource management class without substantially reducing the effectiveness or productivity.

.09 Concepts.

A. Meeting Objectives. Intrusions, whether existing or planned, can be designed to meet predetermined visual resource management class and acceptable degrees of visual contrast.

B. Landscape Character. All landscapes have a readily identifiable character, regardless of size, location, or land use. Within these areas, landscapes that possess or have potential for a greater degree of visual variety are considered more desirable than those that tend towards monotony or sameness. The "VRM" classes referred to in .08A are based on maintaining the natural character of the landscape while allowing different degrees of modification of that character. In order to be able to determine whether a certain management practice will meet the requirements of the quality objective assigned to a given area, it is important to understand the basic elements that determine the character of the landscape. Every landscape, regardless of location, has a definable character. That character is determined, for the most part, by the relationship between four basic elements: form, line, color, and texture. All of the basic elements are present in each landscape but exert varying degrees of visual influence. The more elements there are in the landscape which exert a strong visual influence or contrast, the stronger or more interesting the landscape character. The degree of variety and harmony among the basic elements determines whether or not a given landscape is pleasant to view.

1. The Basic Elements. The following is a brief description of the four basic elements of landscape character and how they are perceived in the landscape:

a. Form. Form is generally considered as the mass or shape of an object. It is most strongly expressed in the shape of the land surface, usually the result of some type of erosion, but may also be reflected on the shape of the openings or changes in vegetation, or in the structures placed on the landscape.

b. Line. Lines found in the natural landscape are usually the result of an abrupt contrast in form, texture, or color. Lines may be found as ridges, skylines, structures, changes in vegetative types, or individual trees and branches.

c. Color. A phenomenon of light or visual perception that enables one to distinguish between otherwise identical objects. A hue, as contrasted with black, white, or gray. Color as perceived in the landscape is usually most prominent in the vegetation but may be expressed in the soil, rocks, water, etc., and may vary with the time of day, time of year, and the weather.

d. Texture. Texture is the result of the size, shape, and placement of parts, their uniformity, and the distance from which they are being observed. Texture, as it is perceived in the landscape, is usually the result of the vegetation or vegetative patterns on the landscape. Texture may also be the result of the erosive patterns in rocks or soil.

A. A measure by which they can determine if a proposed management activity will meet the requirements of the visual resource management class of the area in which it is being proposed.

B. An indication of which visual elements within a proposed management activity need to be modified in order to meet the visual resource management classes.

.07 Basic Philosophy. The degree to which a management activity adversely impacts the visual quality of the landscape depends upon the amount of visual contrast that is created between the activity and the existing landscape character. The amount of contrast between a proposed activity and the existing landscape character can be measured by separating the landscape into its major features (land and water surface, vegetation, and structures), and then predicting the magnitude of change in contrast of each of the basic elements (form, line, color, and texture) to each of the features. Assessing the amount of contrast for a proposed activity in this manner can give a good indication of the severity of impact and serve as a guide in determining what is required to reduce the contrast to the point where it will meet the visual resource management classes for the area.

A. Scenery Quality Rating. For this inventory to be effective, it is important that the following procedure be used:

1. Evaluate all areas which contain interspersed national resource lands within the District boundary, not just BLM lands. In order to help eliminate some of the subjectivity, it is suggested that an interdisciplinary team be formed to do the evaluation.

2. Compare the area to the region in which it is located, not just the planning unit.

3. Keep in mind that the size of the area to be evaluated is not critical. However, it is usually practical to consider rating an entire District in one session. To do this effectively, it is necessary that the people doing the rating be very familiar with both the scenery in the District and with the concepts of this rating system.

4. Using a topographic map as a base (1:250,000 or 1:62,500 are both good tools for this purpose), subdivide the District or area on an overlay into scenery units. The size of the units is of very little consequence. The important consideration is that all of the scenery within the unit be of the same nature. For example, a large area of rolling sage covered hills cut by small drainages containing a variety of larger plants but generally all the same type of scenery could be a unit. A small but spectacular canyon that is distinctly different from the surrounding scenery or a broad valley that has a distinct character of its own could each be a unit. (It would be very hard to separate a narrow canyon bottom from the surrounding hillsides because the hills are such an integral part of the scenery of the canyon.)

5. Apply the key factors of scenery to each unit separately. Remember that each key factor is applied to the unit as a whole, not from any one location or even from a bird's-eye view. Perhaps the principle is best described as the overall impression one retains after driving through, walking through, flying over, or otherwise becoming thoroughly familiar with the unit.

6. After all units have been evaluated, show the classification (A, B, or C) for each unit on the overlay. Also identify any visual intrusions.

B. Use of the Scenery Quality Rating. The scenery quality rating provides the major visual resource input into Step 3, URA (1605.47). It is accompanied by a brief description of the scenery quality and the effect that any visual intrusions might have on that quality.

.12 Step 2: Determining the Visual Sensitivity Level. Using the procedure outlined below, determine the visual sensitivity level for all areas within the Planning Area, or on a Resource Area, or on a Districtwide basis if it is more convenient to present the data at that level.

A. Visual Sensitivity Evaluation. Visual sensitivity levels are an index to the relative importance of visual response to areas within the District, Resource Area, or Planning Area. In brief, the steps to sensitivity level evaluation are: criteria selection, criteria weighting, and field classification and mapping of all land into one of three visual sensitivity levels (high, medium, low).

1. Criteria Selection. Using an interdisciplinary team approach, including management, determine what criteria are valid in considering the importance of the visual resource. It is important that the District or Area Manager be involved because it is through this process and subsequent criteria weighting that management begins to indicate its interpretation of the public values of the visual resource.

2. Criteria Weighting. Using the same team, assign a weight to each criterion. It is very possible that one criterion may be more important than all the others combined. One simple technique for weighting is to consider each criterion against all of the others.

3. Delineating Sensitivity Areas. Delineate on a map areas of similar sensitivity based on type of use, volume of use, relationship to other uses, community relationships and attitudes, land use, or other criteria as appropriate.

4. Field Classification. For each delineated area determine the relative importance of each of the criteria as it applies to that area. Add the weighted scores to determine which visual sensitivity level applies.

5. Review. Before proceeding to Step 3, below, the visual sensitivity levels must be reviewed by the District or Area Manager.

B. Use of the Visual Sensitivity Level. The visual sensitivity will provide visual resource input to the recreation portion of the Planning Area Analysis (1607). It will, along with the visual zone determination (.13 below), provide a method of evaluating demand for the scenic resource as required for the first phase of Step 1, MFP (1608.3).

.13 Step 3: Delineating Visual Zones.
Delineate visual zones for areas in Class B scenery having a high or medium sensitivity level. Delineate only the foreground-middleground zone in Class C scenery areas that have a high sensitivity. Areas in C Class scenery having medium or low sensitivity and areas in A Class scenery do not require visual zone delineation. (See Illustration 11.) This step must be done in the field by actually traveling along each route and observing the area that can be viewed, then delineating the zones on a map. If the route is a highway or trail, it should be traveled in both directions. If a vehicle is used, it is best to have both a driver an an observer. An alternative to this method would be a "VIEWIT" computer program or some other computerized topography delineation method. This step, along with the sensitivity level determination above, is a part of the visual resource input into the Planning Area Analysis (1607.3). Delineate the following visual zones:

A. Foreground-Middleground. This is the area that can be seen from each travel route or sensitivity area for a distance of 3 to 5 miles where management activities might be viewed in detail. The outer boundary of this visual zone is defined as the point where the texture and form of individual plants is no longer apparent in the landscape.

B. Background. This is the remaining area which can be seen from each travel route, to approximately 15 miles. Do not include areas in the background which are so far distant that the only thing discernible is the form or outline. In order to be included within the visual zone, vegetation should be visible at least as patterns of light and dark.

NOTE: In some areas, reduced visibility, due to atmospheric conditions, lessens the distances normally covered by each zone. Also, where the foreground-middleground zone from one travel route overlaps the background from another route, use only the foreground-middleground designation. All areas that are not identified and delineated in the above zones are considered seldom seen.

.14 Step 4: Labeling Areas. On a map or overlay, outline and label the areas which have a similar visual sensitivity level, visual zone, and scenic quality.

.15 Step 5: Assigning Visual Resource Management Classes. Using the chart in Illustration 11, assign a tentative visual resource management class to each area outlined in Step 4 above.

.16 Step 6: Outlining Visual Management-Units. On a separate overlay or map, outline all contiguous areas with the same tentative visual resource management class and label each unit.

.18 Visual Resource Management Classes. The following visual resource management classes are to be used as tentative minimum management objectives for the visual management units identified above. Each visual resource management class describes a different degree of modification allowed in the basic elements of the landscape. The primary character of the landscape will be retained regardless of the degree of modification. (See Illustration 11.) The visual resource management classes are used as the basis for writing the visual resource management objectives in MFP, Step 1 (1608.3) for the visual management units identified in VRM, Step 6, above. The specific recommendations in Step 1, MFP, are based on the visual resource management classes and the opportunities presented in Step 4, URA.

A. Class I. This class provides primarily for natural ecological changes only. It is applied to primitive areas, some natural areas, and other similar situations where management activities are to be restricted.

B. Class II. Changes in any of the basic elements (form, line, color or texture) caused by a management activity should not be evident in the characteristic landscape.

C. Class III. Changes in the basic elements, (form, line, color, texture) caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.

D. Class IV. Changes may subordinate the original composition and character but must reflect what could be a natural occurrence within the characteristic landscape.

E. Class V. Change is needed This class applies to areas where the naturalistic character has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding countryside. This class would apply to areas identified in the scenery evaluation where the quality class has been reduced because of unacceptable intrusions. It should be considered an interim short-term classification until one of the other objectives can be reached through rehabilitation or enhancement. The desired visual quality objective should be identified.

Chart for Determining Visual Resource Management Class

		2/ VISUAL SENSITIVITY LEVEL						
		HIGH			MEDIUM			LOW
SPECIAL AREAS		I	I	I	I	I	I	I
1/ SCENERY CLASS	A	II	II	II	II	II	II	II
	B	II	III	IV	III	IV	IV	IV
	C	III	IV	IV	IV	IV	IV	IV
		FG	BG	SS	FG	BG	SS	SS
		3/ VISUAL ZONES						

1/	SCENERY QUALITY INVENTORY (6310.11)	A, B, C
2/	VISUAL SENSITIVITY LEVEL (6310.12)	High Medium Low
3/	VISUAL ZONES (6310.13)	FG - Foreground-Middleground BG - Background SS - Seldom Seen

---

NOTE: Class I applies only to classified special areas, e.g., Wilderness, Primitive, Natural Areas, etc. This quality standard is established through legislation or policy.

Class V applies to areas identified in the scenery quality inventory where the quality class has been reduced because of unacceptable intrusions.

.1 Use of the Contrast Rating. The contrast rating must be applied in the planning stages to all proposed land management activities that will disturb the soil, change or remove vegetation, or place a structure in the landscape. It should also be applied to all areas that are identified as needing rehabilitation or enhancement. Application of the contrast rating system should be done from the most critical view point or points that are or will be commonly in use. When applying the rating system, keep in mind the following variables are the factors which determine how well the contrast is seen:

- Distance from which the project will be viewed.
- Angle of observation. The apparent size of a management activity is directly related to the angle between the viewers line-of-sight and the slope being viewed. As this angle nears 90°, the maximum area is viewable and becomes most critical.
- Length of time the project is in view. If the viewer has only a brief glimpse of the project, the contrast can almost be disregarded. If, however, the project is subject to view for a long period, as from an overlook, the opportunity to detect contrast becomes very critical.
- Relative size or scale of the project in relation to its surroundings.
- Season of the year and the effects of seasonal changes. Contrast rating should be done considering the heavy or most critical use season.
- Light and how it will effect the project being viewed.
- The effect time has on the healing process. Few projects can be expected to meet the visual classes immediately upon completion. With some long-term projects, such as a strip mine, it may be desirable to have both short-term (5-years) and long-term objectives (completion of the project).

.11 Contrast Rating as a Measure of Meeting Established Visual Resource Management Classes. The following is applied to determine if the proposed activity will meet the visual resource management class assigned to the area.

A. Class I. The degree of contrast for any one element may not exceed 1 (weak) and the total contrast rating for any feature must be less than 10.

B. Class II. The degree of contrast for any one element should not exceed 2 (moderate) and the total contrast rating for any feature may not exceed 10.

C. Class III. The degree of contrast for any one element should not exceed 2 (moderate) and the total contrast rating for any feature may not exceed 16.

D. Class IV. The total contrast rating for any feature should not exceed 20.

E. Class V is an interim classification for rehabilitation or enhancement of an area. Based upon its indicated potential visual resource management class (II, III, or IV), select the appropriate contrast rating.

.12 Contrast Rating as a Guide to Reducing Visual Impact. The contrast rating quickly points out the elements and the features that will cause the greatest visual impact. This provides a guide to the most effective method of reducing the visual impact of a proposed activity or project. Those elements with the highest degree of contrast are the ones that can be attacked and lowered most effectively.

.2 Visual Contrast Application.

.21 Landscape Description. Write a brief description of the existing landscape. Describe each of the landscape features (landform, vegetation, structures) in terms of the basic elements (form, line, color, texture.)

.22 Activity Description. Briefly describe and define the proposed activity or project. Tell how it will be accomplished and the anticipated impacts on the landscape by feature and element.

.23 Contrast Rating. Using the methodology described in .3, determine a contrast rating for the proposed activity. To determine the degree of contrast for vegetation or landform modification, compare the existing vegetation to the proposed modification of vegetation and the existing landform to the proposed modification of landform. For structures, compare the existing landscape (landform, vegetation, and structures) to the proposed structure modification or addition on the landscape. If the activity does not meet the requirements for the VRM Class that has been established for the area (see .11), look at the rating scores to see what can be done to reduce the impact more effectively, then redesign the project and run through the rating process again. If the proposed activity still will not meet the requirements of the VRM Class, a landscape architect should be called in to reassess the design. If the VRM Class requirements still cannot be met, the landscape architect should submit a written recommendation to the District Manager to either go ahead with the proposal with the impacts reduced as much as possible, revise the proposal, or abandon the proposal in favor of protecting the visual resource.

.3 Visual Contrast Rating Methodology. The visual contrast created by a management activity can be measured by determining the contrast caused by that activity in each of the basic elements.

.31 Assigning Numerical Values. The ease of detecting contrast in the basic elements varies on a scale from 4 (form) to 1 (texture). By assigning values that indicate degree of contrast, 3 for strong, 2 for moderate, and 1 for weak, we can set up a direct multiplier for an indication of the strength of the contrast.

Elements	
Form	- 4
Line	- 3
Color	- 2
Texture	- 1

Degree of Contrast	
Strong	- 3
Moderate	- 2
Weak	- 1
None	- 0

A. Contrast Rating Example. Following the visual contrast application in .2, the contrast rating is applied to each of the types of features in the landscape separately. That is, a contrast rating is developed for the proposed change in land surface, for the vegetation, and for the structures. The ease of detection for each element is multiplied by the degree of contrast and the results are added to get a total score. The total score for all three types of feature is not as important as the score for each individual feature but it could give an indication of the overall magnitude of the impact. In long-term projects, such as strip mines, a short-term and long-term evaluation of (contrast rating) should be done.

	Element			Contrast		Score	Maximum Score Possible
Land Surface Features	Form	- 4	X	None	- 0	= 0	
	Line	- 3	X	None	- 0	= 0	
	Color	- 2	X	Moderate	- 2	= 4	
	Texture	- 1	X	Moderate	- 2	= 2	
					Sub Total	= 6	30

Vegetation Features	Form	- 4	X	Strong	- 3	= 12	
	Line	- 3	X	Strong	- 3	= 9	
	Color	- 2	X	Moderate	- 2	= 4	
	Texture	- 1	X	Moderate	- 2	= 2	
				Sub Total		= 27	30
Structures Features	Form	- 4	X	Moderate	- 2	= 8	
	Line	- 3	X	Weak	- 1	= 3	
	Color	- 2	X	Weak	- 1	= 2	
	Texture	- 1	X	Moderate	- 2	= 2	
				SubTotal		= 15	30
						48	90

The overall score (48) indicates a moderate impact. The vegetation contrast (27) is extreme, thus, the project would be very obvious. The most effective place to reduce contrast is in the form and line elements of vegetation, and the element of form in structures.

B. Feature Score. A total score for each feature of 1-10 indicates the contrast can be seen, but does not attract attention; 11-20 attracts attention--the contrast begins to dominate the characteristic landscape; 21-30 demands attention, will not be overlooked.

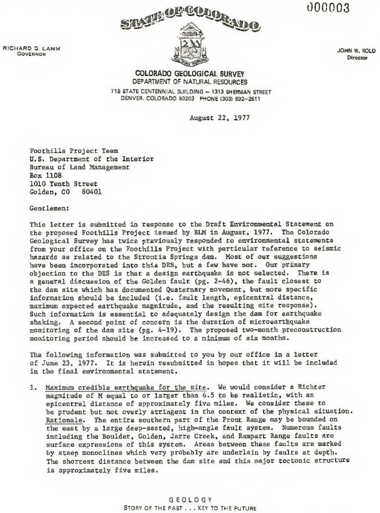
APPENDIX 5

LETTERS WITH INDEX NUMBERS ASSIGNED

AND

EXAMPLES OF VOTE-TYPE LETTERS

LETTERS WITH INDEX NUMBERS ASSIGNED



000003

STATE OF COLORADO

RICHARD D. LAMM
GOVERNOR

JOHN W. ROLD
Director

COLORADO GEOLOGICAL SURVEY
DEPARTMENT OF NATURAL RESOURCES
715 STATE CENTENNIAL BUILDING – 1313 SHERMAN STREET
DENVER, COLORADO 80203 PHONE (303) 892-2611

August 22, 1977

Foothills Project Team
U.S. Department of the Interior
Bureau of Land Management
Box 1108
1010 Tenth Street
Golden, CO 80401

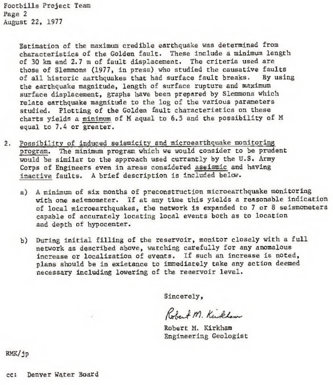
Gentlemen:

This letter is submitted in response to the Draft Environmental Statement on the proposed Foothills Project issued by BLM in August, 1977. The Colorado Geological Survey has twice previously responded to environmental statements from your office on the Foothills Project with particular reference to seismic hazards as related to the Strontia Springs dam. Most of our suggestions have been incorporated into this DES, but a few have not. Our primary objection to the DES is that a design earthquake is not selected. There is a general discussion of the Golden fault (pg. 2-46), the fault closest to the dam site which has documented Quaternary movement, but more specific information should be included (i.e. fault length, epicentral distance, maximum expected earthquake magnitude, and the resulting site response). Such information is essential to adequately design the dam for earthquake shaking. A second point of concern is the duration of microearthquake monitoring of the dam site (pg. 4-19). The proposed two-month preconstruction monitoring period should be increased to a minimum of six months.

The following information was submitted to you by our office in a letter of June 23, 1977. It is herein resubmitted in hopes that it will be included in the final environmental statement.

1. Maximum credible earthquake for the site. We would consider a Richter magnitude of M equal to or larger than 6.5 to be realistic, with an epicentral distance of approximately five miles. We consider these to be prudent but not overly stringent in the context of the physical situation. Rationale. The entire southern part of the Front Range may be bounded on the east by a large deep-seated, high-angle fault system. Numerous faults including the Boulder, Golden, Jarre Creek, and Rampart Range faults are surface expressions of this system. Areas between these faults are marked by steep monoclines which very probably are underlain by faults at depth. The shortest distance between the dam site and this major tectonic structure is approximately five miles.

GEOLOGY
STORY OF THE PAST . . . KEY TO THE FUTURE



Foothills Project Team
Page 2
August 22, 1977

Estimation of the maximum credible earthquake was determined from characteristics of the Golden fault. These include a minimum length of 30 km and 2.7 m of fault displacement. The criteria used are those of Slemmons (1977, in press) who studied the causative faults of all historic earthquakes that had surface fault breaks. By using the earthquake magnitude, length of surface rupture and maximum surface displacement, graphs have been prepared by Slemmons which relate earthquake magnitude to the log of the various parameters studied. Plotting of the Golden fault characteristics on these charts yields a minimum of M equal to 6.5 and the possibility of M equal to 7.4 or greater.

2. Possibility of induced seismicity and microearthquake monitoring program. The minimum program which we would consider to be prudent would be similar to the approach used currently by the U.S. Army Corps of Engineers even in areas considered aseismic and having inactive faults. A brief description is included below.

   a) A minimum of six months of preconstruction microearthquake monitoring with one seismometer. If at any time this yields a reasonable indication of local microearthquakes, the network is expanded to 7 or 8 seismometers capable of accurately locating local events both as to location and depth of hypocenter.

   b) During initial filling of the reservoir, monitor closely with a full network as described above, watching carefully for any anomalous increase or localization of events. If such an increase is noted, plans should be in existence to immediately take any action deemed necessary including lowering of the reservoir level.

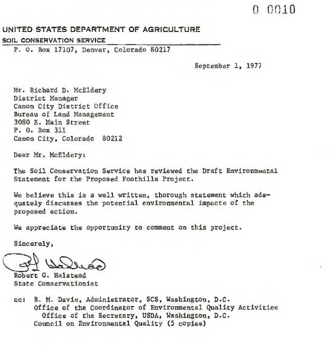
Sincerely,

Robert M. Kirkham

Robert M. Kirkham
Engineering Geologist

RMK/jp

cc: Denver Water Board



0 0010

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P. O. Box 17107, Denver, Colorado 80217

September 1, 1977

Mr. Richard D. McEldery
District Manager
Canon City District Office
Bureau of Land Management
3080 E. Main Street
P. O. Box 311
Canon City, Colorado 80212

Dear Mr. McEldery:

The Soil Conservation Service has reviewed the Draft Environmental Statement for the Proposed Foothills Project.

We believe this is a well written, thorough statement which adequately discusses the potential environmental impacts of the proposed action.

We appreciate the opportunity to comment on this project.

Sincerely,

Robert G. Halstead
State Conservationist

cc: R. M. Davis, Administrator, SCS, Washington, D.C.
Office of the Coordinator of Environmental Quality Activities
Office of the Secretary, USDA, Washington, D.C.
Council on Environmental Quality (5 copies)

United States Department of the Interior
BUREAU OF MINES
BUILDING 20, DENVER FEDERAL CENTER
DENVER, COLORADO 80225
Intermountain Field Operations Center

Office of
Chief

September 7, 1977

Memorandum

To: Bureau of Land Management
Canon City District Office
3080 East Main Street
P. O. Box 311
Canon City, Colorado 81212

From: Chief, Intermountain Field Operations Center

Subject: Review of Draft Environmental Statement for the Proposed Foothills Project (DES 77-24)

As requested by the Colorado State Director, Bureau of Land Management, we have reviewed the Draft Environmental Statement for the Proposed Foothills Project (DES 77-24), as prepared by BLM. Our present review, while done in the absence of a copy of the earlier version of this statement (DES 76-02), indicates that the concerns we expressed in our February 26, 1976, review of the previous statement have not yet been addressed. We, therefore, are reiterating them.

We are concerned about possible adverse impacts on mineral resources in the vicinity of the water treatment plant, where clays, coal, and limestone have been produced from numerous pits, mines, and quarries. According to the statement, the treatment facility would strongly influence the use of adjacent lands as well as the site itself. Without a detailed field investigation, we cannot determine whether this component of the proposed Foothills Project would, in effect, preclude recovery of mineral resources that otherwise might be produced. In particular, sequential use of mined lands, such as the proposed use of the limestone quarry in the SE¼sec. 2, T. 7 S., R. 69 W., for sludge disposal and subsequent reclamation, is desirable but only if no active or probable future mineral-production operation would be displaced and only after recoverable mineral resources have been extracted. This matter should be discussed in the final environmental statement.

Raymond L. Lowrie
Raymond L. Lowrie

cc: Mr. Dale R. Andrus, State Director
BLM - Colo.

DEPARTMENT OF THE ARMY
OMAHA DISTRICT, CORPS OF ENGINEERS
6014 U. S. POST OFFICE AND COURT HOUSE
OMAHA, NEBRASKA 68102

MROPD-M

8 September 1977

Mr. Dale R. Andrus
Bureau of Land Management
Colorado State Office
Room 700, Colorado State Bank Building
1600 Broadway
Denver, Colorado 80202

Dear Mr. Andrus:

This is in response to your request to review the environmental statement for the Proposed Foothills Project, southwest of Denver, Colorado.

In general, the draft statement reflects a great deal of effort in defining and explaining the environmental impacts of the proposed project. Due to the ongoing coordination between your agency and the Corps of Engineers during the preparation of the draft statement, we believe it fully addresses the impacts of our permit actions and impacts to our Chatfield project. We have no further comment at this time.

We appreciate having had the opportunity to complete our review of this draft document. We would also appreciate receiving a copy of the final environmental statement when it becomes available.

Sincerely yours,

John E. Velehradsky
JOHN E. VELEHRADSKY, P.E.
Chief, Planning Division

Denver
ARAPAHOE
COUNTY
board of county commissioners
court house • littleton • colorado

John J. Nicholl
District No. 1

Thomas R. Eggert
District No. 2

Charles A. Pitts
District No. 3

Marjorie Page
Clerk to the Board

Ronald S. Loser
County Attorney

September 16, 1977
Presented at Hearings
Denver, Colorado

District Manager
Bureau of Land Management
Canon City District Office
P.O. Box 311
Canon City, Colorado 81212

I am Tom Eggert, Arapahoe County Commissioner.

I am speaking this morning for John Nicholl and Charles Pitts, two other Arapahoe Commissioners, as well as for Jim Covey, Adams County Commissioner and Bob Clement, Jefferson County Commissioner.*

Collectively we appreciate the opportunity to review the DES and would commend the BLM and other contrituting groups for the thorough presentation. We wholeheartedly wish to express our approval of the Strontia Springs Reservoir-Foothills Treatment Plant as outlined.

If one stands back to see the beauty of the forest rather than to stand among the trees and see only tree trunks we see in the Foothills statement the opportunity to be sensitive to the needs of people-now-and in the future-with very, very little continuing impact on the environment.

We would suggest that summary page, paragraph 3 be presented in a more positive way. It presents a very negative picture without exposing the truth. The truth is buried in the following pages of the statement. We are concerned less the Washington reviewers may not dig deep enough to find the truth and certainly they are not as familiar with Colorado as we are at the local level where government should take place!

For instance, Metro Denver will continue to grow as it offers the life style and environment desired by many (3-5). Water availability will not affect the desire to move to metro Denver. Lack of water will only reduce the life style.

The American people will put up with short term inconvenience when they can see an end point solution. The metro area public responded to the DWB's every third day watering program, but they see no need to continue the inconvenience of scheduling their life style around the irrigation need when there is Foothills as a solution. I must add in all fairness that my lawn has never looked better, but then I am watering every third day instead of once a week.

To address the positives:
We have in Colorado 14,500 miles of flowable water in 3,516 streams. 9,500 miles have significant fishing. 7,100 miles are available for

public trout fishing while 1,600 miles are private. Seventeen hundred miles are stocked by Wildlife on a put and take basis. (Wildlife Division) Wildlife does not expect stocked Rainbow to spawn. The South Platte River is one of the poorer producers of fish per acre of those cited in the report. Why should 1.7 miles of 7,100 miles of public trout stream prevent a potential 2.4 million people from enjoying an outstanding life style? (2-39)

The 18,000 lost visits to South Platte Canyon are lost during construction period. Mitigation however would allow use further upstream during construction. These 18,000 visits (6,000 per year) compare with an estimated 571,600 visits to the South Platte/Cheesman area in 1976. Cherry Creek Reservoir had over 1.5 million visitors in the twelve months ending June 1977. (Parks) Could this be an indication of the popularity of a reservoir over a stream? People are going to find recreation!

The Bighorn sheep herd is a transplanted herd. (COG) The report indicates more attrition of the herd may take place because of lung worm than because of reservoir construction. (3-33) The herd could be moved out during construction and then returned - thereby conserving the sheep. (4-19)

The Peregrine Falcon has been reproduced in captivity by an Air Force Major in Colorado Springs more successfully than naturally. That is until some bureaucrat cited a law and stopped him. Maybe the Peregrine is not suited to a changing world. Again the Falcons may leave, but they can be replaced or return when construction quiets down.

Narrow gage railbeds abound in Colorado! The loss of this short mileage from the total is no loss compared to the loss of adequate water for 2.4 million people. Has anyone considered airlifting the Keystone Bridge to a new site - possibly to an operating narrow gage? What has been done by those against Foothills to save other railbeds? What has been done by them to stop the desecration of old mine structures and ghost towns? How many of you have seen the almost total destruction of old buildings in the mountains?

Does the Keystone Bridge have to become the lousewort or snail darter of Waterton Canyon? Do we lack creativity in finding solutions? We helped raise a temple on the Nile to protect it from a new reservoir to serve the Egyptian people. We can find a solution here!

The Department of Health talks about water pollution. We're not sure what is lost by the 1,753 tons of sediment. How many of you have seen Clear Creek during the spring runoff? Somehow this and other streams clear themselves and the fishing continues.

A hydroelectric generator in the dam will not only cushion the water outflow, but will produce a slight surplus of power over that required to run Foothills. No coal, no smoke, just quietly generated, pollution free, electric power. What a great positive - that is buried in the statement.

As a matter of common sense we ask why so much agitation over some 250 acres? Is an impact statement to be demanded for the recently sold Phipps ranch covering some 22,000 acres with a projected population of over 250,000 with the resulting pollution generated? When do we start to get a balanced perspective and get our priorities in line?

When the future public water use in Colorado may approach 3% of total water availability - and some 94% still will be used for agricultural irrigation - delivered through ditches which lose 50% and more through seepage - and little is being done to conserve this latter loss - we see the need for more common sense being used in supporting the water need of 2.4 million people in metro Denver.

We believe that economy of water service comes from a strong central organization - one with a goal for the future. We believe the DWB is such an organization, has developed its goals, and its continuing efforts need the support of all clear thinking citizens and that of the BLM to provide the water resources to accommodate the planned growth of the metro area. The DWB submitted a plan sensitive to the many environmental situations. We don't need a minority population of transplanted environmentalists to tell the majority what's best for us in metro Denver!

We had some strong willed men build a firm and fair foundation for our nation in 1776. In 1907, another group, the Department of Agriculture published their "Use Book" and showed they too were of firm and fair purpose. We urge the BLM to consider including some of the guidelines for the "Use Book" in the final EIS. We quote:

> "In the administration of the Forest preserves... all land is to be devoted to its most productive use for the permanent good of the whole people..." and further, "You will see to it that the water, wood and forage of the reserves are conserved and wisely used for the benefit of the homebuilders first of all..." and continuing "...where conflicting interests must be reconciled the question will always be decided from the standpoint of the greatest good of the greatestnumber in the long run".

We ask the BLM to keep these points in mind while they prepare the final draft of the EIS. We are sure, that if they do, a stronger statement will result for the benefit of the greatest number of people in the long run.

0 0030

Very truly yours,

COMMISSIONERS OF:

ADAMS COUNTY	ARAPAHOE COUNTY	JEFFERSON COUNTY
John G. Campbell	John J. Nicholl	Robert F. Clement
James M. Covey	Thomas R. Eggert	
Pete M. Mirelez	Charles A. Pitts	

* Since the above statement was presented at the hearing September 16, 1977, John G. Campbell and Pete M. Mirelez have concurred with the statement and ask that their names be included.

Thomas R. Eggert
9/16/7

Environmental Defense Fund

1657 Pennsylvania St., Denver, Colo. 80203 (303) 831-7559

COMMENTS OF THE ENVIRONMENTAL
DEFENSE FUND ON THE PROPOSED
FOOTHILLS PROJECT DRAFT ENVIRONMENTAL
STATEMENT

September 14, 1977

By:
Mohamed T. El-Ashry, Ph.D.
Gerry Trujillo

OFFICES IN: NEW YORK CITY (NATIONAL HEADQUARTERS); WASHINGTON, DC; BERKELEY, CALIF.; DENVER, COL.
Printed on 100% Recycled Paper

The Environmental Defense Fund (EDF) is a non-profit, public membership organization composed of scientists, lawyers, economists, and other concerned citizens dedicated to the protection and enhancement of the human and natural environment through research and legislative, administrative, and judicial action. EDF has approximately 43,000 members nationwide and maintains offices in New York, New York; Washington, D.C.; Denver, Colorado; and Berkeley, California.

EDF submits these comments on the proposed Foothills Project after having reviewed the Draft Environmental Statement prepared by the Bureau of Land Management, information obtained from the Denver Water Board (DWB), and available reports prepared for the Denver Water Board. We are concerned over the planning and management practices of the Denver Water Board which have resulted in great waste of a valuable resource and, if continued, could result in severe hardships among water users in the region. The goal of the Denver Water Board has been to provide the greatest possible supply of water regardless of cost, true demand or efficiency of use.

The DEIS

One of the most important sections in any EIS is that dealing with alternatives to the proposed action. The National Environmental Policy Act (NEPA) is intended to facilitate policy choices, yet there can be no choice if alternatives to the proposed action are lacking or inadequately analyzed. The importance of presenting alternatives is emphasized not only in § 102(2)(C)(iii), but also

---

in § 102(2)(D), which requires that agencies develop "appropriate alternatives" when there are "unresolved conflicts concerning alternative uses of available resources." These two sections of the statute require federal agencies to present reviewers and decision-makers with options other than the one favored by the agency. The alternatives of no action at all, and of another action that accomplishes the original goal but without any of its objectionable features, constitute the extremes between which discussable alternatives fall. However, between no action at all and the perfect alternative lies a wide range of other choices that require sufficient analysis. Examples of such alternatives include: alternatives requiring actions of a significantly different nature which would provide similar benefits with different environmental impacts and alternatives related to different designs or details of the proposed action which would present different environmental impacts.

As important as the range of alternatives discussed in an EIS, is the thoroughness with which each alternative must be discussed. In particular, complete analysis of their environmental benefits, costs and risks should accompany each alternative through the agency review process in order not to foreclose prematurely options which might enhance environmental quality or have less detrimental effects.

We believe that the draft EIS is severely deficient in analyzing all of the possible alternatives. In particular, water conservation measures including metering, recycling (successive use) and reform of rate structures were casually mentioned under the "no action" alternative and not analyzed as an alternative in themselves to the proposed action. We believe that such water conservation measures are environmentally and economically sound alternatives to the continued development and depletion of available water supplies. As long as more water is made available by increased treatment capacity, the current trend in water-use patterns, which is already one of the highest in the West, will continue and even at a higher rate, as projected in the DEIS (from the current average of 210 gallons per capita daily to 228 gallons per capita daily). It is clear that the construction of the Foothills Project will be detrimental to any efforts at instituting any meaningful water conservation measures at present or in the near future. This conclusion is supported by the statements on page III-6 of the 1976 draft Environmental Statement on Foothills which have been dropped in the current DEIS: "The additional treatment capacity would allow per capita consumption to exceed that without the project until 1995," and "[t]he impact of the project on the water priority allocation program would be to delay them for about 5 years."

In requesting a detailed analysis of water conservation measures as a viable alternative to the proposed project we are not asking the Bureau of Land Management to generate raw data or to burden itself with a new research project. Studies have already been conducted by the DWB and for the DWB on metering, recycling,

and alternative rate structures. Analysis of these studies was totally omitted from the DEIS. We have utilized such data as the DWB has released from these studies, in the following analysis of the need for Foothills.

In any water management plan there are sufficient variables to offer many alternatives. For example, the best solution for an imminent water shortage is not necessarily more water. In our opinion, savings in water-use may offer a better solution. The objectives become the determining factor. Building Foothills is no more than an alternative. Decisions in water management and planning have continued to ignore public input and assumed incorrectly public ignorance and inability to decide among alternatives. The Denver Water Board, and for that matter the Bureau of Land Management, as evidenced by the DEIS, assume that they know, better than the public ever could, what is the "best" answer. Therefore, with the "best" answer set forth, the public and decision makers are presented with a yes-or-no choice on the proposed project. This is as patent a violation of NEPA as can be made. Moreover, it is just such practices that cause the polarization of differing points of view and result in "no action."

The Need For Foothills

In their efforts to go ahead with the Foothills Project, the Denver Water Board maintains that there is a pressing need for more water treatment capacity. In our opinion, there is no shortage of treatment capacity at present or in the near future;

instead, the "shortage" is in wise management and efficient use of our limited water supply. Per capita consumption, for example, in the Denver Metro area is one of the highest in the West.

The present treatment capacity of 520 million gallons per day is more than one and one-half times the largest volume put out on any single day this summer which amounted to 338 million gallons according to the DWB. However, without the current restrictions on lawn watering, demand tends to exceed supply only during the few consistently hot days in July and August. So, at a cost of $264,623,000 the DWB is proposing to construct Foothills for the sole purpose of alleviating these few peak demand days. However, their solution--a treatment plant--is no solution. Even with the first phase of 125 mgd treatment capacity at a cost of $135,000,000, maximum-day shortages during the peak-use periods would be eliminated for a period of only 8 years (DEIS at 3-8) and by 1988 additional treatment capacity would be required again.

Table 1-4 of the DEIS presents a projection of the maximum-day and per capita maximum-day demand in the DWB service area through the year 2010. It shows the per capita maximum-day demand to range from 614 gdc in 1980 to 742 gdc in 2010. In contrast, figures obtained from the DWB itself indicate that the per capita consumption this summer when lawn watering restrictions were imposed did not come even close to these projected figures. For example, the highest average monthly per capita this summer was only 275 gallons per day. The imposition of water restrictions, therefore, was clearly very effective in reducing per capita maximum-day demand. The citizens of Denver were extremely cooperative in complying with the restrictions and there were no real

hardships suffered. However, we are not in favor of continued restrictions as a means of reducing or eliminating peak demand days. We believe that alternatives to the costly Foothills Project exist which are cheaper, conserve water in general, as well as during peak demand days, and would also provide the needed supply for a reasonable rate of population growth with the existing treatment capacity and without restrictions. These include: (1) metering of unmetered customers who constitute more than half of all residential users; (2) reform of water rate structure including time-of-year pricing; and (3) recycling (successive use).

Metering could save up to 40 per cent of the water used by flat rate customers who have no incentive to conserve water since they pay the same charge whether they use one gallon or 10,000 gallons. It is economic to conserve water and to allocate the resource as a scarce commodity among the users in such a way that they, the users, pay their proportionate share of the costs of acquiring and delivering treated water to them. Metering constitutes an equitable means of assessing charges for the use of this resource. The per capita water consumption of Denver water users is at 211 gallons per day and the figure has not gone below 200 gallons since 1967. This is 25-33% higher than per capita consumption in Aurora and Boulder. Between 1961 and 1963, the City of Boulder switched from almost 100% flat-rate billing for single family residences to a 100% metered billing. It is interesting to note that the per capita consumption in Boulder was 220 gallons per day before the water users were metered in 1962 and dropped to 160 gallons per day after metering. A very important result was that residential water-use was not only reduced by the installation of meters, but, for at least seven years, residential usage remained at the lower levels. According to a study done for the DWB in 1972, metering could save up to 75,000 gallons per year per meter installed which is about the same amount being saved per residence by the present restrictions, but without the inconvenience and with meaningful savings to the respective individuals. Despite that, the DWB continues to resist the metering of its flat-rate customers. As recently as last week they have flatly rejected a federal grant in the amount of $4 million for the initiation of a metering program in Denver.

Even metered customers at present do not have an incentive to conserve water, because of the present inefficient rate structure of the DWB. The present pricing structure needs to be changed if any meaningful water conservation is to be achieved. A new rate structure should include time-of-year pricing or seasonal differentials, as well as cost-justified geographic differentials. Time-of-year pricing would reduce peak demands and result in savings in costly treatment facilities. A new pricing structure need not be a burden on the poor or limited income families. The amount of water necessary for basic life needs would be priced at a low rate while progressively higher rates would be charged for additional blocks of water. A similar pricing system has recently been instituted in Grand Junction and has resulted in a 30% saving in water consumption.

Recycling is another feasible alternative. Recognizing the potential of successive uses, the DWB investigated the feasibility of recycling. Data from this study show that the cost of treating sewage effluent, even to potable quality, will be competitive with the cost of developing new supplies around the year 1998. A full-scale plant of approximately 100 mgd capacity will cost between 95 and 150 million dollars which is close to the cost of the first phase of Foothills. Therefore, it seems clear that recycling to less than potable quality is a very viable conservation measure, and, in fact, surveys taken by the DWB indicate that the majority of Denver residents would be in favor of such a program as well as one of potable reuse. The city of Colorado Springs has successfully instituted a recycling program whereby 2.5 million gallons of waste water are recycled each day for use in parks, golf courses, and some agricultural activity.

The DWB, solely to foster its own expansions, has consistently resisted the enactment of any effective conservation measures. Yet, their own data indicate that with adequate conservation measures and without the Foothills Project, the present treatment capacity would support a population of 2.4 million which is more than double the present population served by their system. It is important to note that as the water available to the Denver area is overcommitted by the continuous expansion of the service area of the Denver Water Board, the impacts of future droughts or shortages will be very severe and the alternatives will be very limited. That is why it is high time to institute effective conservation measures and careful plans for further expansions of the service area.

The Environmental Protection Agency is funding a $45 billion program to finance 75% of municipal sewage plants over the next 10 years. The EPA is offering this aid to cities, but only if they reduce their water use by 15%. By refusing to institute meaningful water conservation measures, the DWB is jeopardizing the opportunity of the Denver Metro waste treatment facilities to obtain these grants.

Conclusion

In conclusion, we request that the DEIS be withdrawn and that the permit application of the DWB for construction of the Strontia Springs Diversion Dam and Reservoir not be granted. The proposed Foothills Project would only foster continued waste of water resources by thwarting all efforts to maximize the utility and economic benefits of available supplies. We cannot imagine a Federal agency supporting a plan for continued waste of water resources that is not responsive to land use and environmental considerations, consistent with the carrying capacity of the region. Alternatives to costly and environmentally damaging water development projects, for raw or treated water, must be considered in the context of increased efficiency in use, investment in residential water meters, and price incentives.

REGIONAL
REPRESENTATIVE
ARIZONA • COLORADO
IDAHO • MONTANA
UTAH • WYOMING

NATIONAL AUDUBON SOCIETY

P. O. BOX 3232 • BOULDER, COLORADO 80307 • (303) 499-0219

0 0033

September 19, 1977

Bureau of Land Management
Canon City Office
3080 E. Main
Box 311
Canon City, Colorado 81212

Dear Sir:

Thank you for the opportunity to comment on the DEIS for the proposed Foothills Project. We have several major objections to the construction of this project:

1) No serious effort is made to address the necessity for water conservation. Instead of building an expensive dam and water treatment facility which will be obsolete in 75 years, why not consider metering or recycling water. As long as water is made easily available by larger and larger projects, the general public will never believe a problem really exists.

2) Foothills is being proposed so that affluent Denverites can water their bluegrass lawns on peak demand days during the hot summer months. Denver is situated in a semi-arid prairie environment. Residents should consider landscaping with natural vegetation to conserve water. Presently, 40% of the water consumed by a family of four in Denver is for horticultural irrigation.

3) The unique recreational area in Waterton Canyon will be irretrievably lost. The bighorn sheep herd will be reduced by 50%, 1.7 miles of the South Platte River would be converted to reservoir thus the loss of an excellent trout fishery, and the Golden Eagle and Peregrine Falcon nesting in the canyon will be adversely affected.

The estimated life of this $234 million project is a mere 75 years. We don't believe there is justification for the long-term result of a silted-in reservoir, habitat destruction, and loss of valuable recreation so close to the Denver metro area. But, worst of all, we will have done nothing to implement an educational program - to teach people that water is not an inexhaustable resource.

Respectfully,

Robert K. Turner
RKT/dln

United States Department of the Interior
BUREAU OF OUTDOOR RECREATION
MID-CONTINENT REGION

MAILING ADDRESS:
Post Office Box 25387
Denver Federal Center
Denver, Colorado 80225

STREET LOCATION:
603 Miller Court
Lakewood, Colorado
Telephone 234-2634

IN REPLY REFER TO:
E30

SEP 21 1977

Memorandum

To: District Manager, Bureau of Land Management Canon City District Office, Canon City, Colorado

From: Assistant Regional Director, Land Use Coordination

Subject: Review of Draft Environmental Statement for the Proposed Foothills Project (DES 77-24)

This is in response to your request for review and comment on the draft environmental statement for the proposed Foothills Project. Our comments relating to the recreational aspects of the draft environmental statement are as follows.

General Comments

In general, the draft environmental statement provides a good description of the recreation environment and the impacts on recreation associated with the project. However, the distinction between the short-term temporary impacts and the more significant and serious permanent impacts is not readily apparent. For example, the loss of 18,000 visitor days use in Waterton Canyon during construction is not nearly as significant as the permanent loss of the unique canyon features and associated recreation opportunities. This needs to be clarified in the final statement.

Recreation information used for Chatfield Reservoir throughout the draft environmental statement is based on the 1974 Draft Environmental Statement, Chatfield Lake, Colorado by the U.S. Corps of Engineers. The amount of use projected in this document is not currently taking place. To put this in the proper perspective, data should be obtained from the State regarding existing developments and the amount and type of current recreation use at Chatfield Reservoir.

District Manager, BLM, Canon City, Colorado

Several alternative water supply concepts, including construction of the Two Forks Dam and Reservoir Project, are discussed in Chapter 8. This information appears to be based on the recent Bureau of Reclamation study of the Upper South Platte Unit. During the course of that study, the Bureau of Reclamation also investigated several other alternatives, including alternative reservoir sites on West Plum Creek and on the North Fork near Ferndale. Since these alternatives were found to involve substantially fewer adverse environmental impacts, they should also be analyzed in Chapter 8. In particular, the West Plum Creek alternative would both avoid the destruction of the unique free-flowing river in Waterton Canyon and create a more valuable recreation reservoir.

Specific Comments

Page 4-4 -- Recreation

> The first full paragraph states that construction of 2.5 miles of nonmotorized access trail around Strontia Springs Dam and Reservoir will "totally eliminate recreation losses." This statement is very misleading. Although there may not be a loss in the total number of recreationists, the type and quality of the recreation experience will be permanently altered or lost. For example, through-bicycling will be eliminated, kayaking will be eliminated, and the unique and impressive natural recreation features of Waterton Canyon will be severely altered. The same comment applies to the table on page 4-17.

Page 5-25 -- Recreation

> The table does not carry over one of the most important impacts from page 5-16, i.e., that construction activities would alter or permanently destroy many of the unique and impressive natural recreational characteristics in Waterton Canyon. Also, Numbers 6 and 8 will occur only at 500 mgd.

We also have several comments of an editorial nature which we will informally bring to the attention of the Foothills ES Team. Should you have any questions, do not hesitate to contact us.

Robert J. Arkins
Robert J. Arkina

2131 S. Columbine St.
Denver, Colorado 80210
21 September 1977

BLM District Office
3080 E. Main Street
P.O. Box 311
Cañon City, Colorado 84242

STATEMENT CONCERNING THE DRAFT OF THE ENVIRONMENTAL STATEMENT ON THE PROPOSED FOOTHILLS PROJECT (DENVER WATER BOARD):

The subject draft appears to me to containmany sets of data which are inconsistent with one another. Some of these data having to do with water availability at different times, with or without the proposed project and the expected need for water under average use conditions (not always maximum daily use, as is the basis for so many arguments) either are not in agreement, or are so ambiguus I cannot understand them. I am convinced there are errors in the conclusions drawn from faulty use of these data. For example, when I used the data presented in Table 8-3 to calculate average daily water availability without Foothills, it appears that wintertime potential excess treated water could be stored to take care of the few days during the summer when treatment capabilities would be inadequate. Reservoirs for storing treated water could be constructed as subterrean vaults on top of which reacreational areas could be placed. This would provide more open space for a larger population and eliminate the need to damage the environment in any way.

Another alternative which I do not find, and not suggested on page 29a either, is the possible use of the present Aurora intake and tunnel, perhaps with expansion of it. I do not know to what extent the Aurora water system approaches the capacity of its present flow system, but this certainly offers a possibility of getting water to the proposed Foothills Treatment Plant with no further damage to the South Platte environment.

As an ecologist, and somewhat of a horticulturist, I am more at home in making the following observations which I consider are inadequacies (or errors in judgement) presented in the Draft:

1. The assumption that it will take more water per capita with a larger population is wrong. A greater proportion of people will live in congregate housing, with proportionately less irrigated green area per capita.

2. Contrary to what some "horticultural experts" say, it should be possible, through education and enforcement, if necessary, to get larger areas of lawn covered with vegetation which requires only natural precipitation, or at most only infrequent irrigation. Mr. Gundell's largely irrelevant remarks which had little to do with the Draft (Wednesday, September 14) suggesting such ridiculous covers as cactus should be discounted. We have plenty of drought resistant ground covers which have been acceptable substitues for bluegrass.

3. As was demonstrated so effectively this past summer (1977) and during the water restrictions of the 1950's, we can adapt to water restrictions when necessary. Certainly no-one would suggest our restrictions at this time are necessitated by availability of treated water. It is the shortage of raw water in our reservoirs which makes reduced use necessary. Even if this tells what it would be like in the year 2001, the prospects are not frightening.
And in the meantime, if my suggestion of providing adequate storage of treated water for later use (not just for "5 days" as indicated in the footnote to Table 8-2, page 8-9) were implemented at a fraction of the cost of the Foothills Project, we would need to have restrictions only during periods of prolonged drought, as we are in at this time. Incidentally, we should be at the worst of another drought cycle within 3 years, plus or minus, of 1997. (And I went on record of predicting this drought we are presently in five years ago.)

My conclusion is that the Draft does not at this time present an adequate argument for (1) Expenditure of $234 million (p.1-21); (2) Destruction of the unique environment along the South Platte; (3) Almost certain request for the Two-Forks dam at a later date to back up the low altitude storage for the Strontia reservoir; (4) Further damage to private land along the North Fork of the South Platte River above Two Forks area. (My friends at Bailey are already complaining about the stream cutting since the Roberts Tunnel has added flow to the stream.)

Sincerely,
Moras L. Shubert
Moras L. Shubert, Ecologist
(Professor Emeritus,
University of Denver)

MORAS L. SHUBERT
2131 S. Columbine Street
DENVER, COLORADO 80210

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20201

SEP 21 1977

Chief, Planning Coordination Staff
Bureau of Land Management
Room 700
Colorado State Bank Building
1600 Broadway
Denver, Colorado

Dear Sir:

Thank you for the opportunity to review the draft Environmental Impact Statement on the Proposed Foothills Project, Denver, Colorado. The proposed action is an illustration of the dilemma facing a large portion of the populated areas of the country, i.e. the need for identifying new sources of safe water for municipal use and minimizing any preemption of such water from use by other communities. This document does an excellent job in exploring alternatives as well as outlining mitigating actions.

We would, however, suggest that the following comments be addressed in the final EIS.

1. The relevance of the subject plan in the context of the Department of Agriculture Colorado River Quality Improvement Plan, dated May 1977.

2. The efficacy of the water treatment process for producing potable water devoid of adverse health effects. This may be extremely important if new energy sources such as coal gasification, oil shale mining, etc., are pursued in or near the watershed with their potential as sources for direct and indirect pollution.

3. The use of tertiary treated waste water for irrigation purposes should be approached with caution in view of the potential entrance of chemicals into the food chain via plant uptake. It is noted that the DEIS cautions against the recycling of such water as a source of potable water pending completion of research.

4. The possibility of wetlands and mud banks resulting from water diversion. Vector control surveillance should be maintained in these areas.

In summary, each project affecting the quality of the Colorado River should be planned in context of a master plan for the use of the River. Appropriate consideration of the potential for contamination by exotic chemicals attributable to new developing processes and provision for their removal should be considered.

Sincerely,
Charles Custard
Charles Custard
Director
Office of Environmental Affairs

Comments on:

Draft Environmental Statement
Proposed Foothills Project
Bureau of Land Management
U.S. Department of the Interior

by

John R. Bermingham
601 Franklin Street
Denver, Colorado 80218
September 26, 1977

In the pages which follow, the following points are discussed at length concerning the proposal of the Denver Water Department (DWD) for the construction of the proposed Foothills Treatment Plant.

Page

1. Peak day and average day projections supplied by DWD to BLM are grossly misleading, a new Draft EIS must be prepared, and the DWD must take full responsibility for delays needed to correct errors caused by BLM and public reliance on DWD figures. 3

2. The Draft EIS gives so distorted a picture of the facts relating to DWD water resources, facility capabilities, and potential shortages that a new draft must be circulated and another public hearing held before the EIS may be legally finalized. 5

3. The next EIS must explicitly correct the many misleading statements which have been issued by DWD representatives. 9

4. The 1977 experience should be described in detail as illustrative of the life-style which can exist for another 25 years in the DWD service area without increased treatment facilities or increased supplies. 10

Page

5. The Draft EIS is seriously defective in its failure to examine numerous alternatives. 11

6. The scope of the EIS must be expanded to include a fill analysis of the proposed Two Forks and Eagle-Piney projects if the DWD claims the Foothills plant will become useful through development of new raw water supplies. 15

7. Numerous environmental impacts which will result from the construction of Foothills have not been properly described. 18

8. Cost benefit analyses are needed for both the project and also for the various alternatives. 19

CONCLUSION

The 1977 Draft EIS for the Foothills Project is so deficient in its portrayal of the facts, is so distorted in its projections for the future, is so deficient in its description of the environmental impacts of the project and its next phase (the Two Forks dam) and their alternatives, and is so deficient in its failure to include necessary cost benefit analyses, and the public has been so misled both by DWD distortions and EIS errors, that a new draft must be prepared and a new public hearing held before the Foothills EIS may legally be finalized.

John R. Bermingham

1. Peak day and average day projections supplied by DWD to BLM are grossly misleading, a new Draft EIS must be prepared, and the DWD must take full responsibility for delays needed to correct errors caused by BLM and public reliance on DWD figures.

The heart of any discussion of the need for a project such as the Foothills Treatment Plant is the set of projections used to portray peak and average day demands for treated water at various future population levels. In the draft EIS such projections appear in Tables 1-4, 2-30, and 3-2. According to the BLM, the source of the figures used in these tables and then referred to again and again throughout the Draft EIS was the table of figures enclosed with a letter dated January 24, 1977, from William A. Tolle of the DWD to David Talliaferro of the BLM, (Attachment #1.) Suspicion that the EIS figures were false was first raised by the extraordinary step-up between actual average per capita per day consumption of 208 gallons indicated for 1975 in Tables 2-30 and 3-2 and the projected figures for 1980 through 2010 of 226, 228, 229, 231, and 233 shown in Table 1-4. Use data going back for the years 1918 through 1966 was obtained from the DWD (Attachment #2,) and data for the years since 1966 was obtained from the DWD Annual Report for 1976, page 33. Based on this data, graphs were prepared to show per capita consumption from 1918 forward to the present and projections from the present to the year 2010, (Attachments #3 and #4.) On each of these graphs the thin line shows actual experience; the heavy black line is a running average of the actual experience figures excluding the

years 1933, 1934, 1935, 1954, 1955, 1956, and 1977 when restrictions were imposed; and the heavy dashed line is the projection using DWD's January 24, 1977 figures.

It is immediately apparent from examination of these graphs that the figures supplied in the DWD's January 24, 1977, letter are projections of the peak demands which have a probability of occurrence only occasionally and infrequently. These DWD projections are used throughout the EIS to portray the rule, whereas actual experience indicates these projections are valid only for the exception.

To the extent the EIS uses tables and makes comments based on the DWD projections, the EIS should carefully point out that the figures are for the exceptional "worst" case that might happen. It is the more likely situation which should be projected, however, and which should then receive the emphasis in the tables and the text. (It would be quite appropriate to include two scenarios - one for normal years and one for the exceptional years.)

The text should also clearly point out that watering restrictions have been imposed in Denver not only in 1977 but that they were imposed during three succesive years in the 1930's and during three successive years in the 1950's. Yard water restrictions are part and parcel of Denver's life-style response to the droughts which increasingly are being correlated to the 22-year cycles in sunspot activity.

As a direct consequence of the misleading projections supplied by the DWD and the treatment of these projections in the EIS as though they projected the normal, page one headlines in the July 17, 1977 Denver Post blared, "Life-Styles at Stake," and the ensuing article then described the EIS as stating that, "There will be 40 days of water shortage annually by 1990 if the added water treatment facilities aren't constructed." Through statements such as these Colorado's Congressional delegation, government officials ranging from the Secretary of the Interior to county commissioners, business leaders, and the public of the entire metropolitan area have been misled.

The distortions created by the use of exceptional year demand figures as though they were normal year demand figures are so great and the misunderstandings have spread so far and wide that the BLM must issue still another draft EIS and hold still another public hearing before finalizing the Foothills EIS. The DWD knew precisely the purpose for which it was supplying the figures which it transmitted to the BLM on January 24, 1977, it knew precisely how important the figures would loom in the forthcoming EIS, and the DWD was either wilfully deceptive or grossly negligent in not informing the BLM in its cover letter that the figures represented the worst rather than the probable case. The DWD must take full responsibility for delays needed to correct errors caused by the reliance of the public and the BLM on the DWD's own figures.

2. The Draft EIS gives so distorted a picture of the facts relating to DWD water resources, facility capabilities, and potential shortages that a new draft must be circulated and another public hearing held before the EIS may be legally finalized.

Even disregarding the distortions caused by the treatment given the DWD projections as the norm rather than the exception, the portrayal of the factual setting for the Foothills proposal is grossly misleading. The true picture can only be discovered by reading here and there and between the lines. The truth is that unless and until new raw water supplies are developed, the only usefulness of the Foothills plant would be to enable DWD customers to splurge and water without restraint on hot summer days between the completion of the plant's construction, (estimated to be in 1981,) and the time when restrictions must be imposed in any event due to raw water limitations, (which the EIS estimates will occur in 1990.) Numerous changes are required in tables, charts and commentaries throughout the entire EIS in order that this central, most important fact will be clear to the casual reader. (It is to be noted that the raw water limitation is based upon the DWD's estimate that the "reliable" supply of raw water in any year is 312,300 acre-feet and that this figure, as with the projections of demand, may also be an exception rather than the rule.)

Changes which must be made in the EIS in any event include the following:

(a) Tables 2-30 and 3-2 are grossly misleading and should be dropped because they comingle shortages to be expected as a result of raw water supply limitations with shortages to be expected as a result of treatment capacity limitations. The present form of these tables misleads the casual reader into a belief that all of the shortages shown would be cured by the Foothills project, whereas in fact it is only the shortages prior to 1990 which can be aleviated by the project. No table should be included in the Final EIS which does not clearly, explicitly and prominently distinguish between shortages due to the absence of new treatment facilities and shortages which must occur in any event if no new raw water supplies are developed.

(b) In this connection, the plant is projected as having a useful life of 75 years, yet a comparison of projections in columns 7 and 9 in Table 2-30 with the corresponding figures in Table 3-2 shows that because of the raw water supply limitation there will be no difference whatsoever in the availability of treated water after 1990 whether Foothills is or is not built. A table making this type of comparison appeared in the 1976 Draft EIS (Table III-2, page III-7.) Attachment #5 is a table prepared to illustrate this important point. Such a table should appear early and prominently in the next EIS in order to show how truly limited the usefulness of the Foothills project will be.

(c) The differences in per capita consumption shown in Tables 2-30 and 3-2 after 1990 can be traced to differences shown in these two tables in the quantity of raw water sold by the DWD to other distributors, (column 6 in both tables,) but there appears to be no logical basis for such differences; the differences should be eliminated from the next statement.

(d) The differences in per capita consumption shown in Tables 2-30 and 3-2 prior to 1990 are attributable entirely to differences in peak-day useage on hot summer days with Foothills and without Foothills. If Foothills is built, DWD customers will be able to demand and receive all the water they want, whereas if it is not built certain restrictions will have to be imposed on some summer days. The total volume of water involved in these differences will never be as much as 2%. In short, the effect of building

Foothills on the amount of water used will be negligible. The Foothills plant would not increase the ability of the DWD system to permit more taps for the homebuilding industry and the next EIS should make this point crystal clear.

(e) Unless and until new raw water supplies are developed the usefulness of the Foothills plant is limited to the alleviation of peak day shortages prior to the time restrictions must be imposed generally as a consequence of supply limitations, which the EIS estimates will occur in 1990. Despite the fact that this is the only usefulness of the project, the analysis of peak day shortages without the project is almost non-existent. Table 1-5 projects these shortages. The table must be revised in any event because of the erroneous figures described in part 1 of this statement, but the manner in which the number of shortage days are calculated as well as the extent of the shortages should be fully described. In this connection, reliance on DWD projections is not recommended. Attachment #6 indicates how totally unreliable the DWD's peak day projections were as recently as 1973.

(f) The mottled area on the graph of average day per capita consumption, (Attachment #3,) deserves a word of explanation. This is a graphic presentation of the statement that raw water supply limitations will require the imposition of use restrictions around the year 1990 if population and consumption projections increase as expected according to the EIS. The boundary line of the mottled area is a portion of an enormous mathematical curve which can readily be visualized: with a relatively small population in the first half of this century

the 312,300 acre-feet of raw water that currently is reliably available could be divided among the DWD customers with enough available for each one to constitute an almost infinite supply per person, but as population grows without any increase in the supply the amount available per person constantly diminishes. It is suggested that some such graphic presentation of the raw water supply problem be included in the next EIS. Homebuilders will then find it easier to understand why tap restrictions are being kept in force by the DWD even though watering restrictions are being terminated September 30, 1977. This is simply one more method of stating that Foothills will have no significant impact on the availablity of water to support new homes and growth. Foothills is a giant water washing machine - it creates no new water.

3. The next EIS must explicitly correct the many misleading statements which have been issued by DWD representatives.

The distortions and misleading statements circulated by representatives of the DWD are a disgrace and it is unfortunate that it is necessary to make reference to them at all. Nevertheless, so many persons in and out of government have been "taken in" that the next EIS should clearly and explicitly correct the worst of them. Statements made by Mr. Brannan, President of the Board of Water Commissioners, at public meetings, on television, and as quoted on the front page of The Denver Post on September 15, 1977:

> "We currently have an available yield of 65,000 acre feet of water which can't be used because of lack of treatment capacity."

should be quoted and then disclaimed for what they are - absolute falsehoods. The proof can be found by merely comparing such statements with DWD figures that without the 1977 restrictions demand would have exceeded system capacity on eight to twelve days this past summer. Assuming ten to be a correct figure, then only if each of DWD's approximately 930,000 present customers had demanded well over 2500 gallons of water apiece on those days could Mr. Brannan's statement be true. His statement is obviously nonsense to anyone who knows the facts, yet Senator Haskell was misled into repeating such folly on television in early August of this year.

Similarly, statements have been issued by the DWD in press releases and in Water News that this summer's watering restrictions were necessitated by lack of treatment capacity. Countless members of the public have been misled into believing this falsehood and passing it along to others without ever stopping to think how absurd it is to impose restrictions for over 120 days lest treatment capacity limitations force restrictions to be imposed on twelva days. The Final EIS should throughly discredit such statements.

4. The 1977 experience should be described in detail as illustrative of the life-style which can exist for another 25 years in the DWD service area without increased treatment facilities or increased supplies.

The 1977 experience should be described in the next EIS in detail and compared with experiences to be expected under the shortages that are forseeable in years to come, regardless of whether tha shortages are caused by lack of treatment capacity or

restrictions necessitated by lack of adequate raw water supplies. For example, if Denver growth occurs as projected and no new raw water supplies are developed, the per capita average daily consumption will have to be held down by restrictions imposed beginning in 1990 and the per capita consumption that will be permissible is shown in the final columns of Tables 2-30 and 3-2. It is interesting to note, however, that the consumption which would be permissible after twenty-five years of population growth but with no increase in reliable supplies would be approximately the same as the 1977 experience - approximately 164 gallons per capita per average day according to best estimates. (This fact is shown graphically on Attachment #3.) Since this is true, the severe restrictions and dire consequences referred to at pages 2-93 and 8-6 of the EIS, suggesting limitations to winter use rates, loss of fire fighting capabilities, and contamination problems, should be eliminated completely or qualified as being applicable to shortages which are not forseeable for far more than twenty-five years.

5. The Draft EIS is seriously defective in its failure to examine numerous alternatives.

The foregoing discussion is sufficient to show that the supply problem will force restrictions in 1990 whether Foothills is built or not and, also, that without resolution of this basic supply problem the only utility of the Foothills plant will be the increased capacity of the DWD system to meat maximum demands for treated water on hot summer days. This being the case, the major questions which should be addressed by the EIS are: What

are the best estimates of the number and severity of peak day shortages? (see Part 2(e) for an earlier discussion of this problem,) What alternative techniques are available to reduce peak day demand or increase peak day supplies? What are the dollar costs of these various techniques, either separately or in combination? What are the environmental costs of these techniques, separately or in combination? What are the social costs and benefits? Each alternative should be discussed by the EIS in comparable detail.

(A) Increasing the supply of treated water can be accomplished in a number of different ways. Inreasing the DWD system's capability to treat water by construction of the Foothills plant is the method proposed by the DWD. Alternative methods of increasing the supply include:

(1) The Foothills plant could be built at the currently proposed site to a 125 mgd. capacity, but without construction of the Strontia Springs dam. This alternative was described in some detail at the public hearing by Mr. Ben Harding. The next EIS should analyse this proposal. It is to be noted in passing that both the Kassler and Marston treatment plants currently operate without a dam across the South Platte River.

(2) The "low dam" alternative is referred to briefly but not sufficiently in the EIS. It is to be noted that this writer's comments on the 1976 Draft EIS included a specific request that the cost of this alternative be outlined and compared with the DWD's proposal, but this has not yet baen done.

(3) Enlargement of existing facilities should not be dismissed lightly even if the capabilities for enlargment are not great. The maximum extent to which existing treatment plants can be enlarged should be specified and appropriately supported.

(4) Enlargement of treated water storage facilities is yet another method of meeting surges in peak day demand. The surges are of limited duration and excesses over treatment plant capabilities can be met out of treated water storage to the extent storage is available for such purpose. Storage facilities have been increased progressively over the years and must be expected to increase in the future as population grows. The current capacity is 306 million gallons. Comparison should be made with other large city water systems to make an estimate of the storage capacity needed to meet emergencies and an estimate should then be made of the amount of treated water storage that is available to meet peak day demands in excess of the DWD's present 520 mgd. capacity. It is to be noted that the 1976 EIS contemplated that a portion of the then current capacity would be available for this purpose. It has been reported that a study by a Dr. Gordon Milliken at the Denver Research Institute shows that meeting peak day demands by developing treated water storage facilities is less expensive than by enlarging treatment capabilities and it is recommended that this report be explored.

(B) Reduction in demand is as efficient a method of meeting this peak day problem as is increasing the supply. Several methods of reducing demand are available and should be explored in the next EIS in much greater depth than was done in the current draft:

(1) The DWD Annual Report for 1976 shows that roughly 89,000 residential taps are provided water on a flat rate basis without meters. By analysing the data contained in this Annual Report along with the data contained in Tables 2-3 and 2-4 in

the EIS (pages 2-6 and 2-7) it is a relatively simple matter to estimate the quantity of water used per capita by flat rate customers during hot summer months and to conclude that metering would result in an immediate reduction in the peak day demands of anywhere from 20 to 30 million gallons. A more sophisticated analysis obviously is in order, but the implications are profound. Furthermore, if meters are installed throughout the entirety of the DWD service area, the DWD would then be able to impose rates which increase with quantity, thereby lessening demand even further. The fact that customers are price conscious and will make efforts to save water can be deduced from the obviously large sums currently being spent on TV advertisements for devices which lessen the quantity of water used in taking showers. Other conservation devices undoubtedly can be marketed and would be marketed if the entire Denver area paid water rates based on use.

(2) Imposition of peak day watering restrictions is another obvious method of reducting peak day demand. If Denver are residents become informed that millions upon millions of dollars and untold environmental destruction can be spared simply by accepting up to ten or fifteen days of watering restrictions each summer, it is probable that the residents would opt for the restrictions and take them in stride, but the DWD gives them no choice. The attitude of the DWD is that Denver's residents shall be provided with the ability to waste all the water they choose to waste, whether they want this ability or not.

(3) The growth of the conservation ethic is bound to have a favorable impact on peak day demands for water. The experience during the summer of 1977 in the City of Englewood, directly in the

heart of the DWD service area, has been most instructive. Englewood imposed no watering restrictions this past summer yet the simple awareness of water problems elsewhere brought about a significant reduction in daily usage compared to 1976. Education on how to water lawns wisely on hot summer days will also reduce demand, as will changing attitudes about the necessity for having Kentucky blue grass planted across large expanses of suburban school yardsand along highways. Contrary to the opinion expressed by Mr. Flynn concerning the correctness of community attitudes toward conservation which are stated in the current EIS, it is submitted that community attitudes will grow increasingly disposed towards those early American virtues of prudence, thrift and restraint.

(4) Building codes can be updated to eliminate wasteful plumbing devices. Urinals and toilets are notorious for their wasteful use of water. Significant savings can be expected if local governments adopt appropriate revisions to their plumbing codes. Still further reductions in peak day demands would be a direct consequence.

(5) The probable long term transition toward fewer single family homes and more multiple dwelling will also tend to reduce or at least suppress further grown in per capita peaks. Attachment #7 is an article by a foremost housing authority forecasting just such a trend.

6. The scope of the EIS must be expanded to include a full analysis of the proposed Two Forks and Eagle-Piney projects if the DWD claims the Foothills plant will become useful through development of new raw water supplies.

In Trout Unlimited et al. v. Morton et al., 509 F.2d 1276, (9 cir. 1974) the court restated a well established principal that an EIS must extend beyond a currently proposed project when the currently proposed project is dependent upon a subsequent project for its utility. It then elaborated on the meaning of this dependency by stating:

> "The dependency is such that it would be irrational, or at least unwise, to undertake the first phase if subsequent phases were not also undertaken." (Page 1285.)

When dollar costs are compared with the benefits to be achieved by construction of Foothills but without enlargement of the raw water supplies, it becomes obvious that construction of Foothills would be both irrational and unwise. Spending $135,000,000 to assure DWD customers that they will suffer no inconveniences on hot summer days between 1981 when construction can be completed and 1990 when restrictions will have to be imposed due to the limitations of raw water supplies simply makes no sense. If the DWD wants to assert Foothills has utility beyond 1990, then the BLM must prepare a full EIS on whatever portion of the Two-Forks and Eagle-Piney projects are essential in order that Foothills will be actually useful rather than irrational and unwise.

The directive of Mr. Jack Horton which appears at page 8-30 of the EIS,as corrected by the Addendum supplied with the notice of the September 14, 1977 hearing, is incorrect in its

statement that "specific supply sourcea or systems have not been proposed at this time." The DWD has consistently stated and repeated that it plans to proceed with construction of the Two Forks dam and reservoir after construction of Foothills is completed. Attachment #8 speaks for itself. It is a portion of a transcript of testimony presented by the DWD in Water Court proceedings concerning DWD's water rights. These are the same rights as are referred to on pages 1-60 and 1-61 of the EIS. There is no question but that the DWD has one and only one proposal for obtaining water supplies for the Foothills facility and that proposal is construction of the Two Forks dam. The sworn testimony shows that it has been planned since 1918 and as recently as July 4, 1977, at a conference on water sponsored near Colorado Springs by the Wright-Ingraham Institute, Mr. Brannan, President of the Board of Water Commissioners, publicly restated the DWD's intention to proceed with the Two Forks dam and reservoir. THe alternatives to Two Forks outlined in Concepts B and C in part 8 of the EIS are not considered feasible alternatives by the DWD. The fact is, Foothills has been designed to serve as an integral part of the Two Forks project, Foothills has no independent utility unless Two Forks is built, and Two Forks and Foothills are totally dependent upon one another for their utility. No other source of raw water supply for the Foothills project is rational. Therefore, any assertion that Foothills will become a useful project after 1990 immediately places the BLM in the position of having to prepare a full EIS on Two Forks and the related Eagle-Piney project.

7. Numerous environmental impacts which will result from the construction of Foothills have not been properly described.

Even if the assertion by Mr. Horton referred to in the preceding section of this statement is correct, and a full EIS on the Two Forks Eagle-Piney proposal is not necessary, Mr. Horton's directive concerning the scope of the EIS has not been followed. There is only a passing reference to the potential and implications of "exchanges." There is no adequate analysis of the Williams Fork extension even though the DWD has undertaken numerous studies of this potential source of raw water. The enlargement of the Gross reservoir is referred to but the full potential of this proposal is never properly discussed. Each of these potential methods of increasing the raw water supply should be frankly discussed - even if for only one page - so that an uninformed reader can understand the thrust of the proposal as well as its potential.

The environmental impacts of the common elements of Concepts A, B, and C should be collected and discussed in one place in order that the reader will appreciate that certain consequences are bound to occur regardless of the project ultimately chosen for increasing the raw water supply.

Other environmental impacts which should be covered include:

Raw water flows and channelization problems on the various streams are not adequately described, particularly for the 500 mgd. level. This is particularly true for the North Fork of the South Platte below Grant and the flows to be anticiapated through the City of Denver.

The impacts on boating on the North Fork of the South Platte and in downtown Denver in the portion of the South Platte being developed as a park are not adequately addressed in the EIS.

The impacts of increased water usage and flows on the operation of the Metropolitan District sewage facilities should be examined.

The impact on boating on Dillon Lake needs to be addressed along with greater analysis of the impacts on Summit County generally. Attachment #9 is a helpful commentary and it is suggested that the maps of Dillon Lake before and after the projected 74 foot draw-down be included in the final EIS.

Sedimentation problems have not been properly analysed. Attachment #10 describes the problems.

Noise levels are not analysed in relation to ambient noise standards of the State Health Department. It is believed that the noise of the water passing over the dam and through the various project facilities willhave a significant impact on wildlife and homeowners alike for distances as great as five miles.

Recreation impacts could easily be better described by use of photographs which appeared on July 4, 1977 and in August, 1977 in the Denver newspapers.

There is one long-term impact which conceivably is of extreme importance which is not touched upon to the slightest degree. This is the set of problems which will be encountered when the Foothills plant and dam are no longer operable 75 years hence. If DWD customers are dependent upon water supplies which are treated at Foothills and Foothills has been expanded to its full 500 mgd capacity, will the city have to be shut down when Foothills is inoperable?

8. Cost benefit analyses are needed for both the project and also for the various alternatives.

It has already been pointed out that Foothills is a totally irrational project unless new supplies of raw water are developed. Just how irrational the project would be can only be understood, however, through an appropriate cost benefit analysis. It is to be noted that in a letter dated June 23, 1976 from the then Acting Commissioner of Reclamation to the Assistant Secretary of the Interior for Land and Water Resources, the following statement was made: "The Bureau of Reclamation believes that the contentions that the proposed project is not economically viable is a matter that the BLM should address in its final environmental statement." A rough analysis can be made by noting that the volume of additional water that will be used by DWD customers as a consequence of the construction of Foothills, (determined for 1985 by a comparison of figures shown in Tables 2-30 and 3-2,) will be less than 5000 acre feet per year. Spending $135,000,000 to obtain an additional 5000 acre feet of water equates to $27,000 per acre foot, an utterly rediculous price even for permanent supplies, but this proposal is for supplies which will last less than ten years.

The cost benefit analysis is not only necessary to show the irrationality of the project standing by itself, but it is also necessary in order that decision makers may make a rational comparison of the alternatives that are described.

It is not expected that the cost benefit analysis would project the cost of each element of each possible project, but some idea of the cost of these projects and alternatives is essential. For example, the ultimate cost of the Two Forks Eagle Piney project has been variously rumored to range between one and three billion dollars. If so, then the costs of recycling become increasingly attractive. While recycling and treatment for potable water purposes is not feasible in 1977, the technology can be expected to improve to such an extent that this degree of recycling and treatment may become a viable alternative toward the end of this century and certainly early in the next. Recycling as an alternative to the Two Forks proposal will surely receive careful consideration and preliminary cost benefit analyses are presently in order.

Meanwhile, treatment to less than potable quality levels can permit recylcing for industrial uses and lawn irrigation purposes and the technology for these levels of treatment at acceptable costs already is being applied in other parts of the nation. Recycling in the Denver area for industrial and lawn watering purposes would not solve Denver's supply problems, but would partially aleviate those problems and would also implement DWD's duty to reuse imported west slope water. Cost benefit analyses for such recycling proposals are needed now.

Finally, the next EIS should specify that a careful examination has been made of the DWD's plans for the Foothills treatment plant to determine what elements have been sized to accomodate a 700 mgd now, rather than a 500 mgd. The results should then be stated. It is clear that the tunnel from the Strantia Springs Dam to the plant is designed to accomodate a 700 mgd flow. It is also clear that the first conduit from the plant to the metropolitan area is sized at

350 mgd, which is an odd size unless a second conduit of equal size is also contemplated, and it is also clear that full development of the Two Forks Eagle-Piney projects would produce the raw water necessary for flow of 700 mgd. What expenditures are currently being proposed to accomodate 700 mdg flows that are totally speculative? The cost benefit analysis should answer this question.

CONCLUSION

The 1977 Draft EIS for the Foothills Project is so deficient in its portrayal of the facts, is so distorted in its projections for the future, is so deficient in its description of the environmental impacts of the project and its next phase (the Two Forks dam) and their alternatives, and is so deficient in its failure to include necessary cost benefit analyses, and the public has been so misled both by DWD distortions and EIS errors, that a new draft must be prepared and a new public hearing held before the Foothills EIS may legally be finalized.

Copy Roger

Denver Water Department
144 WEST COLFAX AVENUE • PHONE 222-5511 • DENVER, COLORADO 80202

March 24, 1977

Mr. David Talliaferro
Foothills EIS Project
Bureau of Land Management
Denver Federal Center
Building 50
Denver, Colorado 80225

Dear Dave:

Reference is made to letters dated March 11 and March 17, 1977 to you from William W. Johnson of the Denver Regional Council of Governments. Based on these two letters, the contents of which were developed by DRCOG in consultation with Water Department planners, the total population served with Denver treated water is shown on the attached tabulation. (Please note an addition error for the year 2000 in the March 17th letter - the 104,500 should be 104,400).

At the request of Larry Nelson we have developed the maximum day and raw water requirements for these corresponding populations. Also shown on the tabulation are the figures related to full utilization of the Foothills Plant expanded to the 500 mgd capacity.

Sincerely,

William A. Tolle
William A. Tolle
Director of Engineering & Construction

WAT/ee

Attachment

DRCOG POPULATION PROJECTIONS INCLUDING SUPPLEMENTAL SERVICE

Year	Population Served	Max Day (MGD)	Treated Water Requirement	Total Raw Water Requirement
1980	958,400	589	242,977	287,991
1985	1,057,200	672	269,710	318,149
1990	1,162,900	763	298,331	348,912
2000	1,434,100	1,003	371,509	428,422
2001	1,460,100	1,020*	378,530	436,171
2010	1,693,700	1,257	441,719	505,982

*Foothills at full @ 500 MGD

Attachment #1 p. 2

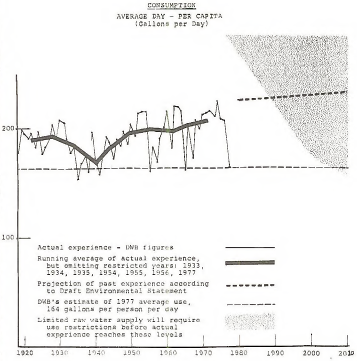
Attachment #1 p. 1

CONSUMPTION OF FILTERED WATER

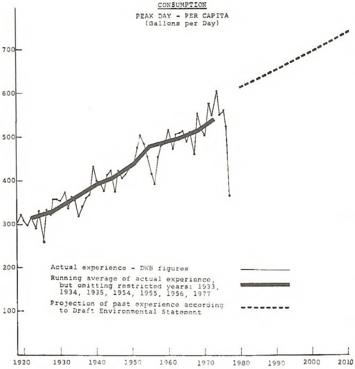
Year	Acre Feet Per Year	Million Gallons Per Year	Average Million Gallons Per Day	Million Gallons Maximum Day	Population	Average Gallons Per Capita Per Day	Precipitation 1-1 to 12-31
1918	55,010	17,925.09	49.11	82.13	268,000	183	17.78
1919	60,268	19,638.33	53.80	86.56	270,000	199	13.63
1920	59,695	19,451.71	53.15	84.04	272,000	195	9.81
1921	59,069	19,247.72	52.73	82.09	276,000	191	14.55
1922	62,621	20,405.05	55.90	90.08	285,000	196	12.95
*1923	60,219	19,622.35	53.76	85.80	295,000	182	21.42
1924	67,780	22,086.16	60.34	100.85	306,000	197	11.07
*1925	61,836	20,149.12	55.20	81.14	313,000	176	9.78
1926	64,758	21,101.53	57.81	104.52	316,000	183	13.06
1927	68,253	22,240.31	60.93	103.42	320,000	190	15.88
1928	73,506	23,951.93	65.44	115.94	323,000	203	14.61
*1929	69,040	22,496.82	61.64	116.40	325,000	190	15.42
*1930	75,982	24,758.63	67.83	115.71	326,000	208	9.12
1931	75,499	24,601.44	67.40	122.63	329,000	205	13.16
*1932	70,635	23,016.39	62.89	112.00	331,000	190	10.12
+1933	65,739	21,420.94	58.69	120.44	334,000	177	12.07
+1934	69,107	22,518.35	61.69	120.08	335,000	183	8.93
+1935	58,100	18,931.79	51.87	108.86	340,000	153	17.23
*1936	64,732	21,092.81	57.63	117.52	345,000	167	16.54
1937	68,650	22,369.50	61.29	127.45	350,000	175	10.88
1938	63,310	20,629.60	56.52	130.54	354,000	160	19.46
1939	78,351	25,530.79	69.95	155.37	360,000	194	7.58
1940	71,925	23,436.66	64.03	147.97	370,000	173	12.03
1941	67,575	22,019.39	60.33	149.77	381,000	158	17.68
1942	79,294	25,837.81	70.79	153.20	405,000	175	16.45
1943	87,193	28,411.88	77.84	165.74	405,000	192	9.03
1944	86,162	28,075.86	76.71	172.48	408,000	188	13.03
1945	79,570	25,927.90	71.04	154.00	412,000	172	13.58
1946	89,578	29,188.80	79.97	177.94	422,000	190	11.95
1947	90,056	29,345.00	80.40	178.28	438,000	184	16.68
1948	101,829	33,181.26	90.66	190.69	461,000	197	10.98
1949	99,262	32,344.71	88.62	204.83	477,000	186	15.54
1950	112,044	36,509.36	100.03	211.78	490,000	204	11.81
1951	111,278	36,260.26	99.34	246.09	516,000	193	15.50
1952	122,111	39,789.44	108.71	255.61	**507,000	214	10.42
1953	127,649	41,593.81	113.96	255.81	530,000	215	12.56
+1954	130,482	42,517.96	116.49	247.39	542,000	215	6.27
+1955	101,252	32,992.99	90.39	233.31	561,000	161	11.57
+1956	117,842	38,399.23	105.20	224.22	573,000	183	8.99
1957	110,067	35,864.91	98.26	265.73	582,000	169	17.71
1958	125,902	41,025.07	112.40	284.30	592,000	190	13.96
1959	135,317	44,092.97	120.80	293.15	602,000	201	13.74
1960	147,939	48,205.76	131.71	316.16	612,000	215	11.26
1961	127,351	41,497.35	113.69	299.42	623,000	182	17.66
1962	157,441	51,301.62	140.55	324.63	639,000	220	8.00
1963	161,398	52,591.52	144.09	336.66	659,000	219	11.84
1964	164,199	53,504.37	146.19	349.34	678,000	216	9.95
1965	137,163	44,694.69	122.45	348.77	710,000	172	18.49
1966	165,326	53,871.98	147.59	371.25	722,000	204	8.07

* Irrigation on alternate days only
+ Special irrigation restrictions
* Drop in population served due to Englewood discontinuing service from Denver

Attachment #2



Attachment #3



Attachment #4

HOW GOOD ARE DENVER WATER BOARD PROJECTIONS?

Peak-Day Usage
(Million gallons per day)

Year	DWB's 1973 Projections*	Actual Experience**
1974	523	485
1975	541	500
1976	560	474
1977	579	331 (Restrictions)

*Source: DWB 1973 Annual Statistical Report
**Source: DWB 1976 Annual Statistical Report
(1977 figure given over telephone)

Attachment #5

INCREASED AVAILABILITY OF TREATED WATER IF FOOTHILLS IS CONSTRUCTED

The following projections are reproduced from Tables 1-4, 2-30, and 3-2 which appear in the 1977 Draft EIS for the Foothills Project:

								Calculated Projections	
		Raw Water which Will Be Used (Acre-Feet)		Raw Water Shortages (Acre-Feet)		Per Capita Use of Treated Water (Gallons/av. day)		Per Capita Increases in Use of Treated Water With Foothills	
Year	Raw Water Needs of DWB Service Area	Without Project	With Project	Without Project	With Project	Without Project	With Project	Gal. per day	%
1975		235,865	235,865			208	208	0	0
1980	267,899	267,580	267,899	319	0	226	226	0	0
1985	295,953	291,244	295,953	4,709	0	224	228	4	1.8%
1988	313,123		312,300		823		228		
1990	324,569	312,300	312,300	12,269	12,269	220	220	0	0
2000	398,532	312,300	312,300	86,232	86,232	180	181	1	.5%
2001	405,740	312,300	312,300	93,440	93,440	176	178	2	1.1%
2010	470,681	312,300	312,300	158,381	158,381	152	154	2	1.3%

Attachment #6

Fri., Sept. 16, 1977, Denver, Colo. Rocky Mountain News— 67

Business and finance

Builder calls soaring home cost atrocious

By MIKE NOLAN
News Business Editor

The president of the nation's largest construction industry association Thursday called the price of the average single family house "unbelievable, incredible and atrocious."

Gerald Oliver, head of the Associated Builders and Contractors, said the average price of a new house in the United States now stands at $51,900.

Oliver predicted that the high cost of housing, coupled with rising anergy prices, would force people to return to the inner cities from the suburbs to be close to their work and to cut back on commuting expenses.

Oliver, a Traverse City, Mich., contractor, was interviewed by the News while in Denver for a Thursday night meeting of the Rocky Mountain chapter of the ABC at the Rodeway Inn.

He said the "flight to the cities" would take place in the next 15 to 20 years and that such issues as school busing which drove people to the suburbs would be overshadowed by sheer economics.

"WHEN GASOLINE REACHES a dollar a lot of opinions will change," Oliver said.

A lot of things have caused housing costs to soar, Oliver said, including the "insanities" of ecologists and even business, when it comes to the cost of money and land.

"These things are putting single family homes out of business," Oliver said. "With the cost of traveling and with urban blight, we are going to have to have people come back downtown.

"In Denver, people are going to have to make up their minds that if they want to live in the mountains, they are going to have to find work in the mountains, and if they are going to work downtown, they are going to have to live downtown," he said.

One factor that will make living downtown much cheaper, Oliver said, is that all the utilities already are in place in the cities, while they must be constructed in the suburbs.

Oliver noted that the return to the cities was going to involve tremendous social and economic changes on the part of the population.

HE ALSO NOTED that when he began in the construction business in 1949 he could build a three-bedroom house with a basement for $5,700.

Society, he said, will have to come up with programs to assist in the return to the cities.

"I don't see any other answer than a return to the cities," he said.

On another subject, Oliver was critical of President Carter's proposed reform of the nation's labor laws.

The proposal, Oliver said, was a thinly- veiled organization attempt by the big unions, who he said had lost 4 per cent of their membership in the past two years – "the biggest drop ever."

"The labor unions need help," he said. "It's just a shame that government feels it has to help."

He said the unions were losing members and failing to attract new members because today's young people were more discriminating and the unions have failed to come up with viable programs.

"The real problem is the lack of interest among the new work force in joining unions," Oliver said.

AND THE REAL reason labor unions want federal labor laws changed, he said, is to make it easier for the unions to organize in the Sunbelt, where most of the right-to-work laws exist and where industry is moving in big numbers.

"This self-serving legislation, which dishearteningly has the active support of President Carter, is being marketed by organized labor as a measure to speed up the procedures and strengthen the enforcement powers of the National Labor Relations Board," he said. "In actuality, the proposal is a myriad of one-sided punitive provisions, including federal contract debarment and double damage payments, as well as provisions to make the unionization of an open shop easier for organizers.

"Organized labor has assembled a war chest of nearly $800,000 to buy slick advertising and engage public relations professionals to hoodwink the press, the public, and ultimately the Congress. However, I feel certain that if all of management works together once more, this bill will have the same fate as common situs."

IN A LABOR DAY message issued earlier this month, Oliver praised the efforts of some "far-sighted" union leaders who he said are attempting to reintroduce competition into the construction industry.

ABC is a national association of about 12,000 construction contractors, subcontractors, suppliers and associates who favor the merit shop philosophy – "that is, they believe that every contract should be awarded on the basis of qualification and price, regardless of labor relations policy."

Oliver is serving a one-year term as president of the organization. He said the construction industry is a $45 to $50 billion dollar a year business, representing 10.1 per cent of the gross national product in 1975.

Attachment # 7

IN THE DISTRICT COURT IN AND FOR
WATER DISTRICT NO. 1
STATE OF COLORADO
CASE NO. 3074-72, 3074-74, 3075-72
3075-74, 3076-72, 3076-74

IN THE MATTER OF THE APPLICATION)
FOR BIENNIAL FINDING OF DUE)
DILIGENCE OF THE CITY AND COUNTY)
OF DENVER ACTING BY AND THROUGH)
ITS BOARD OF WATER COMMISSIONERS.)

REPORTER'S TRANSCRIPT
(November 6, 1974)

A P P E A R A N C E S:

SAUNDERS, SNYDER & ROSS, 225 East 16th Avenue,
Denver, Colorado,
By MR. GLENN G. SAUNDERS,
On behalf of the City and County of Denver by and through the Board of Water Commissioners;

MR. KENNETH L. BROADHURST, Legal Division, Denver Water Department, 144 West Colfax Avenue, Denver, Colorado,
On behalf of the Applicant, The Denver Board of Water Commissioners;

MR. LOREN SWICK, Water Resources Division, 1845 Sherman, Denver, Colorado,
On behalf of the State of Colorado.

This matter came forward regularly for hearing on Application for Biennial Finding of Due Diligence, before Mr. Steven M. Hannon, sitting as Water Master, Water Court, Water Division 1, at the Weld County Courthouse, Greeley, Colorado, at the hour of 10:40 o'clock a.m., November 6, 1974.

WHEREUPON the following proceedings were had, to wit:

Attachment #8 p. 1

IN THE DISTRICT COURT IN AND FOR
WATER DISTRICT NO. 1
STATE OF COLORADO
CASE NO. 3074-72, 3074-74, 3075-72
3075-74, 3076-72, 3076-74

IN THE MATTER OF THE APPLICATION)
FOR BIENNIAL FINDING OF DUE)
DILIGENCE OF THE CITY AND COUNTY)
OF DENVER ACTING BY AND THROUGH)
ITS BOARD OF WATER COMMISSIONERS.)

REPORTER'S TRANSCRIPT
(November 6, 1974)

A P P E A R A N C E S:

SAUNDERS, SNYDER & ROSS, 225 East 16th Avenue,
Denver, Colorado,
By MR. GLENN G. SAUNDERS,
On behalf of the City and County of Denver by and through the Board of Water Commissioners;

MR. KENNETH L. BROADHURST, Legal Division, Denver Water Department, 144 West Colfax Avenue, Denver, Colorado,
On behalf of the Applicant, The Denver Board of Water Commissioners;

MR. LOREN SWICK, Water Resources Division, 1845 Sherman, Denver, Colorado,
On behalf of the State of Colorado.

This matter came forward regularly for hearing on Application for Biennial Finding of Due Diligence, before Mr. Steven M. Hannon, sitting as Water Master, Water Court, Water Division 1, at the Weld County Courthouse, Greeley, Colorado, at the hour of 10:40 o'clock a.m., November 6, 1974

WHEREUPON the following proceedings were had, to wit:

Attachment #8 p.2

THE MASTER: My concern is that I want to make sure I have the ruling properly identified for later determination. If we can, it would be appreciated.

MR. SAUNDERS: I--We will be very careful about that. I am familiar with keeping a record very carefully over a period of 45 years. I don't expect to miss this year. I have been doing this for that long, and I am going to tie this together very carefully.

Now, it may be true that in this particular matter all that is required here is a presentation of the efforts to complete the water rights which are before the Court from the time of the last decree. But the record is going to show more than that because it is unfair to the Master to not give at least a brief background of what has gone before and the waterworks system as a whole. And, therefore, our first testimony will be regarding the waterworks system of Denver as a whole in order to indicate how it is that this is an integrated system and only one system.

While the record is already complete on this point, we think that it is desirable from the standpoint of proper information of the present Master. Now, I have your permission, already, to do this; and for that reason then, I call my first witness, Mr. Fischer.

ROBERT W. FISCHER,

called as a witness on behalf of Applicants, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. SAUNDERS:

Q. Will you state your name?

A. Robert W. Fischer, F-I-S-C-H-E-R.

Attachment #8 p. 3

Therefore, the concern here with the development of Two Forks is directly related to the development of Narrows. If Two Forks were not built, if I understand this, flood water would be available for storage in the Narrows Reservoir. This is one of the reasons why the Court is concerned with the reasonable diligence.

MR. SAUNDERS: That has no bearing on our diligence hearing in our view of the law. And we think that the past statement of the law is totally incorrect. We will go on our theory; and we hope that is adequate, because I think that the conditional decrees are not reservations of the water. Or, furthermore, that the sheriff's case makes it perfectly clear that the city not only has the right, but the duty to anticipate growth.

THE MASTER: I understand that, and I had asked for a memorandum at the first meeting which was held last month. I am afraid of being robbed of presentation of evidence. Without that I feel I have to make certain inquiries to determine whether it is right or wrong, ultimately.

MR. SAUNDERS: I don't know about the memorandum. I can give you my memorandum from Denver. I think that is conclusive of the matter.

THE MASTER: Now, you were going to testify as to-- further about the Dillon Reservoir.

THE WITNESS: Dillon Reservoir has been a capacity of about ~~23,000~~ 250,000 acre feet. Nearly all of that is useable capacity, very small portion being optimum, very small, in order to come out with the diversion or supply of water of Blue River at that time, which averages out to be something in the range of 130,000 to 150,000 acre feet per year.

Attachment #8 p.4

Naturally, when projected by the average that means you had some lows and some highs when you come up with the average. On the average the high runoff years of this will exceed the available capacity. That water must be gotten in order to make the average.

In addition to that, the method of use of the water from the Dillon Reservoir, pattern of use of the water in the Metropolitan Area, also requires that you have got to have additional storage capacity in order to make the most optimum use of the water available on the Blue River. That is generally the idea of transferring water from Dillon Reservoir into the large area of storage.

THE MASTER: Mr. Saunders, if I could, I need to ask a punch-line question at this point.

Did your construction of Dillon anticipate the optimum construction of Two Forks?

THE WITNESS: Yes, it did. Two Forks Reservoir has been a part of the plan of Denver Water Department for development ever since the Department came into existence, 1918; and it has been delayed, if you call it that, for a number of years, principally because of, or until the time that there is a sufficient water system, supply system, collection system, in existence or close to existence, which will provide the necessary waters to store in Two Forks Reservoir.

MR. SAUNDERS: In order to get to Two Forks, we had to move the railroad out, just go right through there. We had to have a court trial with the city. There has been continuous work done on this reservoir. And one of the reasons for beginning work on the Dillon Reservoir and Blue River

Attachment #8 p.5

---

that the contingency that the reservoir would not be constructed for whatever reason--financing, engineering, whatever--the possibility of expanding Dillon or some other alternative?

MR. SAUNDERS: Now, I wish to remind the witness that there was a study made in connection with the Environmental Impact Statement. You might delineate that.

THE WITNESS: The studies have been going on and we have looked at various alternatives. And, as I said before, Two Forks Reservoir site is unique for the eastern slope of Colorado; and there aren't any like it, a site on which a reservoir should be constructed. We have felt that way for a long, long time. That is the feeling as of this time.

We have every intention to build and have a reservoir at Two Forks or water for the Metropolitan Area of Denver. Now, certainly there is a possibility that it may not ever be built. There is also the possibility that the world will come to an end.

THE MASTER: Mr. Fischer, I am trying to get the facts here, and I am merely saying if you have detailed plans and made for Denver's reasonable need? And what I am trying to get you to speak to, is the Two Forks Reservoir an absolute necessary element in those plans?

MR. SAUNDERS: I point out that that absolute on necessity is an outside issue of the case.

Q. Would you delineate the immediacy of the need of the reservoir, which has been the basis for putting pressure on the Bureau?

A. The water supplies of the water system of Denver will be enhanced by a reservoir such as Two Forks. There is

Attachment #8 p.6

---

got into some difficulties and it has been dropped.

Q. Now, does the state engineer of Colorado want to have some water for his grass program?

A. He has expressed an interest in having some capacity in Two Forks for storage of water for the depreciation caused by wells.

Q. To fullfill the firm object of this court?

A. I hope so. I probably should also mention with respect to Two Forks that the Water Department has made an agreement with the Bureau of Reclamation which provides for the Bureau of Reclamation to provide consulting services to the Water Department and the Water Department's design and planning of the Foothills project. This is so that the work and construction of the Foothills project would be done in a manner such that it would be compatible with the Bureau of Reclamation's support of the project, and we have been paying the Bureau of Reclamation for those services in order that the project, the total project, will be put together in a compatible manner.

MR. SAUNDERS: I have no further questions.

THE MASTER: Then let me just sum up here if I can.

With respect to the actual reservoir, itself, is the acquisition of some land and money paid for by the Citizens Committee, as far as actual work on that reservoir?

THE WITNESS: We didn't pay any money to the Citizens Committee.

THE MASTER: Well, you spoke about being involved in a meeting with the Citizens Committee as a necessary commitment with the Bureau of Reclamation.

Attachment #8 p.7

THE WITNESS: Oh, that is all together different than paying money to the Citizens Committee.

In addition to that, and I think I said this before, a lot of time and effort on the part of a few people in the Water Department has gone into providing data and information to the Bureau of Reclamation's aspect of the Denver Water system, which are becoming a part of Two Forks study by the Bureau.

The efforts which the Bureau of Reclamation's design engineers and planners are doing as related to the Foothills project of Denver is essentially part of the development of Two Forks. We have spent time and money in discussing the time necessity and the expense necessity in discussing this project with Bureau of Reclamation people. This all points toward the direction of Two Forks as a Federal project for the people of Denver.

THE MASTER: Again, please confine your comments to the period we are talking about, since the last showing of-- the last four years.

THE WITNESS: I was. There were also discussions with people in Washington D. C. and members of --staff members of various companies, and so on. I think that summarizes it.

THE MASTER: Is there any physical construction at the site--the proposed site?

THE WITNESS: No. You don't do that with a 550 foot high concrete arch dam until you have everything under control.

THE MASTER: Mr. Fischer, what I am getting at, is there any sort of test work being done?

THE WITNESS: Core drilling has been done.

THE MASTER: In the last four years?

Attachment # 8 p.8

THE SUMMIT COUNTY 25¢

JOURNAL

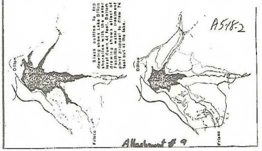
Breckenridge, Colorado September 15, 1977 Vol. 98 No. 36

Inside the Journal

Oktoberfest Saturday - *see pages 7, 8, 9, 10.*

Mime any day - *see page 2*

TV everyday - *see pages 26 & 27*



Black outline to top drawing shows Lake Dillon shoreline with the water level down 44 feet. Bottom drawing shows effect of Foothills water treatment plant proposal to draw 74 feet out of the lake.

Attachment # 9

A518-2

Foothills plant would lower lake by 74 feet

A water diversion plan that would lower Lake Dillon by 74 feet, but double the water treatment capacity of the Denver Water Board, is being strongly opposed by local officials.

County commissioners chairman Scott Gould and Regional Planning Commission representative Rick Rixon are in Denver today, testifying at a public hearing on the proposed Foothills Water Treatment Plant. It was discovered only this week that the water treatment plant, long opposed by environmentalists, would have such a detrimental effect on Summit County.

Gould found the 74-foot requirement in reading the Environmental Impact Statement on the proposed project. He said the plan would cause a 56 per cent decrease in the water surface of Lake Dillon, from 3,233 acres to 1,416 acres. "And that's in an average year," he said, pointing out that the decrease might be even more in a drought year (see diagram).

The proposed plan by the water board would decrease stream flows before the point of diversion by 88 per cent said Gould. "They admit it would have an impact on fish and trees."

Of equal concern to local officials is the effect the drawdown would have on the county as a summer recreation resort. The lake is a drawing card for summer tourists interested in fishing and boating.

As an example of what the loss of 74 feet of surface water would do, Gould said the shore line would be down to about 12 miles, from the normal 27 miles. The proposed Frisco marina would be about a mile from the water, he said.

While the economic and aesthetic aspects of the plan will be presented today, Gould said the main attack will be against the impact statement itself.

"The statement doesn't satisfy the requirements of the national environmental act," said Gould. "We feel that the primary and secondary impacts of the project still haven't been addressed."

Gould said a similar statement was presented two years ago and turned down because it did not address pertinent questions and issues. Gould said this new version still doesn't consider alternatives to the treatment plant, such as the possibility of recycling water or implementing water restrictions.

"Our approach will be 'Is this a valid Environmental Impact Statement?' We'll argue that it isn't. We will ask questions that hopefully they will have to answer in the final draft."

The impact statement is being presented in its draft form for the first time today.

Summary of Deficiencies in Draft EIS of Proposed Foothills Project Relating to Sedimentation

(1) The data on the sedimentation in the Foothills Draft EIS is contradictory. The sediment yield figure of .15 acre feet per square mile per year (page 2-51) does not correlate to the stated silt storage capacity (page 3-2). Using the .15 yield rate (which the proponents obtained from the 1974 maps prepared by the Colorado Land Use Commission and the Soil Conservation Service), sediment would reach 100% of the reservoir's capacity in about 62 years, rather than the 27% (2110 AF) indicated in the DEIS.

(2) The DEIS does not articulate the process by which the 2110 acre feet (p. 3-2) silt storage capacity is determined nor provide the necessary facts to determine the accuracy of that figure.

(3) The DEIS is not clear on the amount of increase in sediment from additional transmountain diversions being carried in the North Fork of the South Platte.

Attachment #10 p.1

BACKGROUND TO CONCLUSIONS

(1) Data is Contradictory

The typical method used to obtain the annual siltation for a reservoir is to multiply the sediment yield (expressed in acre feet per square mile per year) by the drainage area.

The DEIS on page 2-51 indicates a sediment yield of .15 AF/mi^2/year. The DEIS does not specifically identify the number of square miles in the drainage area for the project. However, a review of the Bureau of Reclamation's study for Two Forks (May 24, 1966) shows that the drainage area is 833 square miles.

If one multiplies 833 square miles by .15, the annual siltation rate is 125 acre feet. At this rate, sediment would occupy 100% of the reservoir's capacity in about 62 years.

However, the DEIS indicates that silt storage capacity for the reservoir is 2110 acre feet for the 75-year life of the project. To have arrived at this figure, either a smaller drainage area or a smaller sediment yield figure must have been used. The Sediment Inflow Study for Two Forks conducted by the Bureau of Reclamation gives the sediment yield of .046 acre feet per square mile per year. This is based on actual stream measurements. It would appear that the 2110 AF silt storage capacity is based on a sediment yield number closer to that determined by the Bureau of Reclamation.

(2) Process of Calculation is Omitted

The draft EIS does not indicate the drainage area nor spell out the method by which the 2110 acre feet silt storage capacity was determined. The DEIS only provides general drainage areas (p.2-25) but never identifies the number which is being used for the calculations.

(3) Increase in Sedimentation Not Identified

The DEIS indicates an increase in sedimentation from the development of the 125 mgd plant. However, it does not identify the increase in sediment which would result from increase in the quantity of water carried in the North Fork from additional transmountain diversions. While the water would be "clear" coming out of Dillon Reservoir, there would be additional bank erosion and pick up of bedload.

Attachment #10 p.2

0 0044

United States Department of the Interior
NATIONAL PARK SERVICE
ROCKY MOUNTAIN REGIONAL OFFICE
655 Parfet Street
P.O. Box 25287
Denver, Colorado 80225

IN REPLY REFER TO:
L7619 (RMR)PC

SEP 23 1977

Memorandum

To: State Director, Bureau of Land Management, Denver, Colorado

From: Regional Director, Rocky Mountain Region

Subject: Draft Environmental Statement-Proposed Foothills Project

We have reviewed the subject statement and offer the following comments:

The summary discussion in the draft environmental statement on potential impacts of the project should address not only the proposed action as outlined on pages 1-12 to 1-27, but also impacts on cultural resources of interrelated project proposals required for collection and supply of raw water to the treatment plant.

Reference to consultation of Federal Register on page 2-78 should refer to issue of February 1, 1977, and subsequent monthly issues rather than 1976.

(Sgd) Lynn H. Thompson

Lynn H. Thompson

cc:
Ms. Jo Ann Graham, Bureau of Land Management
Canon City District Office

A-5.19.1

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

---

0 0045

Advisory Council on
Historic Preservation
1522 K Street N.W.
Washington, D.C. 20005

September 23, 1977

Mr. Dave Taliaferro
Foothills ES Team Leader
Bureau of Land Management
P. O. Box 311
Canon City, Colorado 81212

Dear Mr. Taliaferro:

The Council has received and reviewed tha draft environmental statement (DES) for the Proposed Foothills Project, Colorado. Pursuant to Section 102(2)(C) of the National Environmental Policy Act of 1969, the Council has determined that this DES is inadequate because it does not demonstrate compliance with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f, as amended, 90 Stat. 1320) with regard to this proposal. However, it appears that the Bureau of Land Management recognizes its responsibilities pursuant to Section 106 and will carry them out in the future. Should this proposal be approved, we look forward to working with the BLM in accordance with the "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800) as appropriate.

Should you have any questions or require additional assistance, please contact Brit Allan Storey of the Council's Denver staff at (303) 234-4946, an FTS number.

Sincerely yours,

Michael H. Bure

Louis S. Wall
Assistant Director, Office
of Review and Compliance

The Council is an independent unit of the Executive Branch of the Federal Government charged by the Act of October 15, 1966 to advise the President and Congress in the field of Historic Preservation.

---

0 0049

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
REGIONAL OFFICE
EXECUTIVE TOWER - 1405 CURTIS STREET
DENVER, COLORADO 80202

REGION VIII

September 22, 1977

IN REPLY REFER TO:
8DE

Mr. Dale R. Andrus
State Director
BLM, Canon City District Office
Post Office Box 311
Canon City, Colorado 81212

Dear Mr. Andrus:

This letter is in response to your draft Environmental Impact Statement (EIS) on the proposed Foothills Project. Particularly, the statement does not address the secondary or indirect impact of growth in the Denver area. As you are aware, the Council on Environmental Quality (CEQ) guidelines require that secondary impacts be addressed.

As you indicate, your draft EIS is based on several assumptions as listed on Page 2-91 and 2-92. We strongly disagree with assumption Number 2. This assumption indicates that human population will continue to grow as estimated by the Denver Regional Council of Governments (DRCOG) with or without the Foothills Project. As we understand, the DRCOG population projection used as one of its assumptions the availability of water. Your removal of the variable of water availability invalidates the basis for the population projection. You implied in your discussion of this statement that the Department of Housing and Urban Development (HUD) concurred with this assumption, and we wish to categorically deny HUD agreement on this point.

Based upon our review, we find that the major purpose of this proposal is to allow construction of the Strontia Springs Diversion Dam and Foothills Treatment Plant at 125 million gallons per day (mgd). This will enable the Denver Water Department (DWD) to use water presently available from its existing collection-storage-diversion system. With the additional 125 mgd treatment plant capacity, demands associated with the growing population within the treated-water service area could be met until around the year 1983. Increasing the plant capacity to 500 mgd will then enable the DWD to treat additional raw water, not yet developed, to meet maximum-day demands until around the year 2001.

The addition of the proposed 125 and 500 mgd Foothills Treatment Plant is anticipated to change the pattern of operation of all existing DWD treatment plants. The higher elevation of the Foothills Treatment Plant will allow it to function as the primary source of treatment for the entire DWD treated-water service area. The Moffat, Marston, and Kassler Treatment Plants would then be used only to augment the primary supply from Foothills. This will allow expansion of treated-water service into the higher elevations of the Denver Metropolitan Area without the need for costly pumping. These higher elevations contain much presently undeveloped land on which your project will enhance growth. We believe that a cost comparison should be provided contrasting the gravity-flow Foothills alternative with various pumping alternatives.

We feel the deficiency in your statement is related to your failure to recognize or deal with the secondary impact of growth.

Your statement is further deficient in that you do not consider the impact of projected growth on the social environment. We feel elements such as educational facilities and health services should be assessed for their capability to handle anticipated growth. These concerns were expressed to you in our letter of March 1, 1977, to Mr. Dave Taliafero.

In addition to the above general comments, we would like to add the following specific comments.

1. Figure 1-1 has a "Foothills Operating Gradient" but does not appear to have taken into account any head losses.
2. On Page 2-14, you state that the average horticulture investment per dwelling unit in the six county Denver area was $2,000. You further state "A $2,000 investment in horticulture per dwelling unit is equal to 9.5 percent of this average annual income." We feel you need to clarify that this is a one-time expense and not an annual investment as implied.
3. On Page 2-10, you indicate the median fire protection rating was 7 for 22 fire departments. This type of median rating renders the information meaningless.
4. We are unable to ascertain the relevance of the Carley Survey described on Page 2-10 and 2-12 to the proposed project.
5. You failed to indicate whether or not the DWD will be able to utilize the anticipated 112,900 acre feet of water from the Dillon area as shown on Table 3-3, if the Foothills Project is delayed or rejected. If the DWD cannot use the total amount of water available, what will be the effect on water quality of the Colorado River Basin?

6. Paragraph 2 and 7 of Page 2-13 arrives at averages for respective counties but did not take into account population differences of the various counties.

7. Your statement on Page 2-21 that the Moffat System "is not impacted by the proposal" conflicts with the discussion on Page 1-20 on how the operation of the entire system (DWD) will change with the addition of the Foothills Plant.

We feel the issues we have mentioned in this letter indicate serious deficiencies in your statement which must be addressed for you to have an adequate EIS. We appreciate the opportunity to comment on this document.

Sincerely,

Robert J. Matuschek

Robert J. Matuschek
Assistant Regional Administrator
Community Planning and Development

COLORADO RIVER WATER
CONSERVATION DISTRICT

September 23, 1977

Bureau of Land Management
Canon City District Office
3080 East Main Street
P.O. Box 311
Canon City, Colorado 81212

Foothills Draft Environmental
Statement

Gentlemen:

Enclosed are the comments of the Colorado River Water Conservation District on the Draft Environmental Statement Proposed Foothills Project prepared by the United States Department of Interior Bureau of Land Management. We request that they be read and included in the record on this matter.

We also request that our several inquiries and questions be answered. We will, of course, respond to the questions you may have concerning our comments.

Very truly yours,

Roland Fischer

ROLAND C. FISCHER
Secretary-Engineer

RCF:dvc

Enc.

COMMENTS OF THE COLORADO RIVER WATER CONSERVATION DISTRICT ON DRAFT ENVIRONMENTAL STATEMENT PROPOSED FOOTHILLS PROJECT, COLORADO

SEPTEMBER 23, 1977

The Colorado River Water Conservation District (the District), created by the Colorado State Legislature in 1937 (Chapter 37 Article 46 Section 101 CRS 1973), is the primary Western Colorado Water policy body, and includes all of 12 and parts of 3 more Western Colorado Counties. The District is governed by a board of 15 Directors appointed by the Board of County Commissioners of each of the respective counties. This statement is submitted as instructed by the Board.

The Colorado River and its principal tributaries originate within the boundaries of the District which has responsibilities for the conservation and safe-guarding of the waters of the Colorado River to which Colorado is equitably entitled under the 1922 Colorado River Compact. Further, the District is the holder of many decrees issued by the Colorado Water Courts for the application of waters of the Colorado River to beneficial use. The District's, it's decrees, many individual owners of Colorado River water rights, and the State of Colorado would be adversely affected by the actions described in the Bureau of Land Management's Draft Environmental Statement for the Proposed Foothills Project.

Before we comment upon the Draft Statement itself, we make the following preliminary remarks:

We observe that the Department of Interior was and is very aggressive in its efforts to delay or even prevent construction of Congressionally-authorized irrigation and water conservation projects in the Colorado River Basin in Western Colorado and the Department has a history of being slow to produce the associated environmental impact statements for irrigation projects in the Colorado River Basin. Quite the contrary is true in the case of Foothills. The Department produced the Draft Statement in (for it) record time and presumes to substitute its own judgement as to the use of the waters of the Colorado River for that of the Colorado Courts. Certainly the Department of Interior or anyone else may make assumptions of amounts of out basin diversions and estimates of those amounts can be published but the Department fails to meet its responsibilities by leading the reader to assume there is integrity in the published assumptions. We request that the Final Statement include language that makes it clear that the Denver Water Department does not hold decrees for many of the increased out-basin diversions assumed in the Draft Statement. We also notice that this District was not included in the list included within the summary of those organizations to whom the Department of Interior on its own made the Draft Statement available.

The Statement is inadequate and insufficient especially in that it fails to give full consideration to the impact of the increased diversions of high quality water from the Colorado River Basin that it anticipates to supply the Foothills plant.

Although our comments are critical by definition, they are intended to provide positive input to the Bureau of Land Management's decision process. We hope they will prove to be useful.

Our comments follow:

CHAPTER I
DESCRIPTION OF THE PROPOSED ACTION

Maps 1-5 and 1-6 on pages 1-15 and 1-16 respectively are misleading to the extent that there is no location map, and there is no way to relate the size of the service areas to the rest of the state.

Table 1-4 on page 1-17 is at least part of the basis for the assumption that a 500 mgd plant must be built. The population projections in Table 1-4 are the basis for the water requirements. These population figures are presumably from DRCOG as are those for Table 1-5. However, there is no discussion as to the accuracy or acceptability of the population projection. An expert witness from the U. S. Bureau of Census did not wholly agree with the Denver Water Board and DRCOG populations during the trial (C.A. 2371, 1529, 1548, in Water Division 5) when the Denver Water Board failed to obtain decrees for water from the same West Slope streams this Draft Statement assumes will be diverted by Denver under Concepts A, B, and C in Chapter 8. We request that the Final Statement include an analysis of the reasonableness of the population projections.

The assumption is made that the plant must be built to 500 mgd to supply the peak demand with no thought to managing the peak. The same concept is stated further in the text on un-numbered page 1-18 where we find, "Increasing plant capacity to 500 mgd would enable the Denver Water Board to treat additional raw water not yet developed, to meet max-day demand until about 2001."

In the second paragraph on page 1-19 there is a discussion of the Denver Water Board having rights to a total average raw water supply of 312,200 acre feet annually. Please explain how this conclusion is reached.

Under the heading Interrelationships, we find on page 1-59 a terse discussion of Green Mountain Reservoir on the Blue River. It would be appropriate at this point to include a more thorough discussion of the Blue River and Green Mountain Reservoir decrees including the Green Mountain Reservoir refill decree, and Senate Document 80 (75th Congress, First Session).

CHAPTER 2
DESCRIPTION OF THE PRESENT ENVIRONMENT

At page 2-21 a discussion of the Roberts Tunnel system has a stated capacity of 1,000 cubic feet/second. We request that language be included to avoid misleading the reader who might think the Roberts Tunnel has a right to divert the water at 1,000 cubic feet/second. Please insert language setting forth the fact that the decreed direct flow diversion through the Roberts Tunnel is limited to 788 cubic feet/second.

On page 2-23 in the penultimate paragraph is found language "Prior water rights down-stream on the Colorado River are recognized by the Denver Water Board in its operation of the Roberts Tunnel and Moffat systems collection and storage facilities.". This language makes the Denver Water Board sound like an eleemosynary institution. We request that the words "are recognized" be stricken and the words "must be recognized under Colorado Water Law." be substituted.

On page 2-29, we find a brief discussion of ground water. We request that the Final Statement include an analysis of the extensive ground

water supplies in the Denver Basin as an alternate water supply

CHAPTER 3
ENVIRONMENTAL IMPACTS OF THE PROPOSAL

On page 3-13 under the subheading Colorado River Watershed we find "Essentially there will be no impact on the surface water in the Colorado River Watershed with the project at 125 mgd." This terse statement alone is not sufficient. We request the Final Statement discuss why there would be no impact. In the second paragraph there is a discussion of the Foothills Plant at a capacity of 500 mgd and the requirement of concurrent development of additional raw water supplies and the fact that several sources are available. We find the discussion that "Although no commitment to develop one or more of these potential sources is to be made on the basis of this Environmental Statement, discussion of several of these sources and their general impacts are presented in Chapter 8. All of these sources are tributaries of the Colorado River: The Fraser, Williams Fork, Blue, and Eagle Rivers." This is an indication of the Department of Interior's increasing orientation towards transmountain diversion from the Colorado River Basin regardless of decrees and almost totally ignoring the Eastern Slope alternatives including the previously mentioned ground water. We request the tone and specifics of the Final Statement emphasize alternative Eastern Slope water sources and the bias towards increasing diversions from the Western Slope be eliminated.

CHAPTER 5
ADVERSE IMPACTS WHICH CANNOT BE AVOIDED

At page 5-2 under the heading Water Resources, and the subheading Surface Water, in the first paragraph we find the continuing assumption that a 500 mgd plant must be constructed and that the additional raw water supplies must come from the Colorado River Basin of Western Colorado. "Colorado River Basin flows would reduce and South Platte River flows would both increase and decrease depending upon..." We request that the Final Statement include a complete analysis of the adverse impacts on Western Colorado and Western Colorado streams with full discussion of why the Department of Interior thinks increased diversions from the Colorado River cannot be avoided.

CHAPTER 6

No specific comments at this time

CHAPTER 7

No specific comments at this time.

CHAPTER 8
ALTERNATIVES TO THE PROPOSED ACTION

Throughout Chapter 8 we find the continuing assumption by the Department of Interior that the only alternative water supplies which should be considered for a 500 mgd plant are increased transmountain diversions of high quality water from the Colorado River Basin. This assumption is presumably based on information supplied by the Denver Water Board but not analyzed by the Department of Interior.

In Concepts A, B, and C, the text maps and figures discuss diversions of specific amounts of water from streams of the Colorado River Basin. This gives the impression of careful, knowledgeable calculation. Indeed the Department of Interior must have accurate data to make its decision to issue or deny a right of way or use permit for federal lands. The public, affected agencies , and decree holders must also have accurate data for informed, objective analysis and comment. Because the assumptions of stated amounts of increased diversions from the Colorado River Basin to supply the Foothills treatment plant is the basis of the entire draft report we request that the Department personnel who prepared the data base for the assumptions meet and discuss it with personnel of this District. We request discussion of the details of the hydrologic and water rights calculations and assumptions and the analysis used in the determination of the acre feet volumes shown. We ask specifically how the analysis takes into account the Colorado priority system of water rights, the Colorado River Compact of 1922, and the Upper Colorado River Compact of 1948, how the senior Colorado River Basin rights were to be supplied and how the amounts shown for out basin diversion to the Foothills plant were determined recognizing the fact that the Denver Water Board does not hold decrees for the water assumed to be available in Chapter 8.

Anyone can show numbers in a Draft Environmental Statement but the Department of Interior which has lately claimed to be expert in Colorado and western water resources law, has the responsibility to substantiate its numbers. It appears possible that the Department of Interior did not investigate whether or not the Denver Water Board holds

decrees for Colorado River Basin Water assumed to be available to Foothills. We request the data base, hydrologic and water rights assumptions be shown in detail in the Final Statement or that the Final Statement show that the Colorado River Basin water assumed to be available to Foothills is not available or is seriously questionable.

The graphs of Figures 8-1 and 8-2 on pages 8-7 and 8-8 respectively imply the Department of Interior's concurrence that peak demands should be addressed through massive capital investment instead of giving consideration to the alternative of the management of peaks.

In the first full paragraph on page 8-12, there is a discussion of police methods to restrict irrigation for horticultural purposes in residential areas. On pages 8-14 and 8-15 there is brief discussion of recycling waste water as a water conservation measure but the two are not addressed together and indeed on page 8-15 we find in the last sentence "System improvements and recycling appear not to be feasible in the immediate future." Although direct recycling for drinking purposes has recognized economic, technological, and psychological limitations the Draft Statement does not mention the city of Colorado Springs' successful recycling program which is used almost exclusively for parks, golf courses, median strips, and other horticultural purposes to reduce the draft on their capital investment requirement for water treatment plants. There is no mention of the advantages of dual systems with one using reclaimed water for lawns and horticultural irrigation. We request that there be an extensive analysis of recycling for non-human uses and the associated effect on capacity requirements, capital investment, and future diversions from the Western Slope, and that it be presented in the Final Statement.

Metering is given only cursory treatment. On page 8-13, there is a brief discussion under the subheading Universal Metering of rate escalation associated with metering. It appears likely that the installation of meters could reduce consumption on the 89,500 unmetered taps in Denver by 18,000 to 25,000 acre feet of water per year. The Denver Water Department has stated in the media that it would cost $30 million to install meters. This is approximately 1/3 of the capital investment Denver experts have testified to the legislature would be required to develop and divert 25,000 acre feet annually from the West Slope.

The Draft Statement does not discuss costs of meters vs. capital investment for treatment plants or related transmountain diversions. We request that these subjects be analyzed in detail in the Final Statement. We also request that the Department of Interior analyze the Denver Water Board's financial statements for an objective determination of the DWB's ability to finance say the front-end investment in universal metering.

On page 8-15, in the third full paragraph under the subheading Water Resources is the comment that "Average annual flows downstream of Dillon Dam would be reduced by the amount of increased diversions through Roberts Tunnel." This statement appears to assume that the Blue River decrees and stipulations are to be ignored. We request that this comment be clarified in the Final Statement.

The last paragraph under the subheading Water Resources is a cursory discussion of the increased salinity in the Colorado River caused by increased out basin diversions. We request that a full analysis of the salinity detriments including economic effects in the Colorado River Basin in Colorado caused by increased transmountain diversions be presented in the Final Statement.

Under the heading Alternate New Sources of Raw Water the introductory discussion begins at page 8-29 continues to the addendum on page 8-29a and concludes on page 8-31. In a November 1, 1976 letter the Department of Interior directed that this redraft of the Foothills Environmental Statement include the discussion of new sources of raw water to meet the 500 mgd capacity of the Foothills treatment plant and that:

> "The subject document should also be expanded to identify and assess the environmental impacts associated with the various alternative sources of water supply, storage, and transmission, including transmountain diversion if necessary that could reasonably be expected to meet the 500 mgd capacity of the Foothills treatment plant. The discussion of alternative sources of water supply and storage facilities should include:
>
> a) the Chatfield reservoir;
> b) enlargement of Gross reservoir;
> c) extension of the Williams Fork Collection system;
> d) transfer of South Platte and Bear Creek ditch rights;
> e) exchange of transmountain effluent;
> f) the proposed Two Forks project. "
>
> "Because specific supply sources or systems have not been proposed at this time, these alternatives should be treated generally as to their adequacy in terms of single units, or in combination to supply the 500 mgd Foothills treatment operation. It should also be stated that a future site-specific environmental assessment will be required for any eventual decision and action that is related to the development of these alternative water supplies."
>
> "Based on this clear directive, a memorandum of understanding was written to Bureau of Land Management from Bureau of Reclamation stating:
>
> It is our intention to discuss those alternatives which can reasonably be expected to enable the Denver Water Board to have waters available for treatment at a Foothills plant with a capacity of 500 mgd. The facilities associated with such alternatives may include storage and collection systems on the West Slope, East Slope storage necessary to regulate transmountain diversion and/or waters obtained through acquisition of agricultural water rights.
>
> There will be no attempt to show engineering feasibility or economic justification for any of the water supply alternatives. The discussion of water supply alternatives will be limited to a few (two or three) most reasonable methods of meeting the 500 mgd requirements for the Foothills plant. Reclamation will furnish complete writeups on each..."

Although we are somewhat encouraged that the Department appears to recognize that an environmental impact statement (s) must be submitted for new out basin diversions from the Colorado River we are appalled that there is no mention or recognition that the Department must take into account Colorado's appropriation priority system governing water resources.

Chapter 8 is not a thorough investigation of all viable alternate new sources of raw water, but instead makes the continuing assumption that 1) Transmountain diversions shall be the primary source of raw water for Foothills and 2) that the plant must be located at the Foothills site. This District recognized that the DWB has decrees to Dillon Reservoir and the Roberts Tunnel and that the treatment plant can be built at the optimum location. However, the Department of Interior apparently not considered as a "viable alternative new source of water" the large amounts of available ground water in the Denver Basin, other alternatives and the possibility of other viable treatment plant sites.

This section instead discusses three alternate "new sources" in three concepts, A, B, and C to provide raw water supplies to the Denver Water Board's metropolitan service area. The discussion is limited to surface water to meet the assumed requirement for a 500 mgd plant at the Foothills location.

In each of the concepts the Department of Interior assumes increased transmountain diversion of high quality water without consideration of the fact that in most cases Denver does not hold decrees for the water. In Civil Actions 2371, 1549, and 1548 the Master Referee ruled that "...there's been no demonstration that the Board of Water Commissioners of the City and County of Denver formed a definite intent as of the date claimed to proceed with those projects..." He ruled that the DWB did not show it intends to appropriate water from the West Slope streams that are assumed in the Draft Statement to be available to supply Foothills. We request that the Final Statement Include detailed discussion explaining why the Department of Interior has assumed Colorado River Basin Water should be diverted to the Foothills plant when the DWB did not form an intention to divert it.

The Master Referee continued, "...that the decrees sought by Denver should be denied."

Concept A

At page 8-32 and Table 8-14 on page 8-35 we find language that indicates the enlargement of the Moffat system and Roberts Tunnel would increase diversion from the Western Slope by approximately 52,000 acre feet; this includes collection from Straight Creek diverted to Dillon Reservoir. We request that the Department of Interior to explain the source of its data and calculations whereby the increases of 19,000 from the Moffat system and 33,000 from the Roberts Tunnel is determined and the basis of the decision assuming diversion from Straight Creek.

At page 8-56 there is discussion of tourism and recreation in Dillon Reservoir. The DWB holds decrees for Dillon Reservoir and in supplying a water treatment plant at the Foothills may draw essentially all of the water from Dillon Reservoir. We request that the Final Statement include an analysis on the effect on recreation as a result of the DWB drawing all of or nearly all of the water out of Dillon Reservoir.

Concept B

Concept B includes additional emphasis on the exchange of treated Denver sewage effluent for agricultural water and increased diversion from the Blue River Basin. The Blue River decree and stipulation in the consolidated cases (C.A. # 2782, 5016, and 5017) addresses the question of Denver being required to reuse water transported from the Blue River. Although the proposal in Concept B may or may not be inconsistent with the Blue River decree and stipulations, it does not appear that Concept B addressed the question of the required pro tanto reduction of diversions from the Blue River as set forth in paragraph 4(g) of the stipulation. We request that the Final Statement address that provision.

Concept C

Again we find the assumption by the Department of Interior that it can substitute it's judgement for Colorado Water Law. Here it is assumed that there is to be 123,000 acre feet of new transversions, 47,000 acre feet from the Moffet and 76,000 from the Roberts Tunnel collection system with Straight Creek and the Eagle Diversion. Concerning the "Eagle Diversion", we request that the Final Statement address the following facts:

The Denver Board of Water Commissioners does have a decree for Homestake Creek and Eagle River waters which the Draft assumes to be capable of supplying 32,000 acre feet (Figure 8-5, page 8-95). We request the Department to explain how it determined that 32,000 acre feet is available to the Foothills plant when Denver is junior in the priority system on Homestake Creek and the Eagle River to both the existing Homestake Project and its expansion owned by the cities of Colorado Springs and Aurora, and the Colorado River Water Conservation District's Redcliff Project pending before the Federal Power Commission.

We request also that the Department address in detail its decision that 35,000 acre feet will be available to Denver from that portion of the system labeled "Lower Eagle" on Figure 8-5 on page 8-95 when the Denver Water Board does not have a decree for the water.

On pages 8-96 through 8-98 under the subheading Description Features and Operation, there is a brief discussion of the energy required for pumping. We find on page 8-98 that approximately 17 million kilowatt hours average annual energy would be required for pumping. Although there is a substation located on the south side of Interstate 70 near Wolcott and a coal fired thermal power plant near Hayden there is no discussion of the ability of the existing facilities to meet a load requirement of 17 million kilowatt hours per year. Instead we understand from other sources that not only is the output of the Hayden plant totally committed to others but the output of the Yampa plant now under construction in Craig is likewise committed to others. There is no discussion of the pollution load and associated air quality deterioration that would be caused by 17 million kilowatt hours per year presumably to be generated by thermal fire power plants. We request that the Final Statement include an analysis of the availability of pumping energy and its sources including the option that the energy be generated and the pollution load assumed in Metropolitan Denver and not on the Western Slope.

On page 8-101, we find the following sentence which appears to be added as a disclaimer: "The operation of the expanded William (sic) Fork collection system would be consistent with Colorado Water Law and other legal agreements, the need for additional water in Denver, and the capacity of the DWB's system to transport and store water." We request that this statement be expanded and made clear as to its meaning in the Final Statement.

On page 8-104 in the second full paragraph we find a discussion expressing concern over salinity water quality of the waters to be stored at the Wolcott Dam site for the subsequent transversion. In the next paragraph the text is solicitous of the quality of the Frazer, Williams Fork, and Dillon Reservoir for the waters to be transverted. We observe that the Department of Interior is less than concerned about the effects on salinity water quality in the Colorado River Basin as a result of the transversion. We request that the Department's policies be changed and the change be reflected in the Final Statement.

There is a brief discussion of the effects of increased out basin diversions on salinity in the Colorado River Basin on page 8-110. The discussion is limited and tends to reflect the attitude that nothing can be done to mitigate or reduce the damage and the Colorado River Basin in Western Colorado must simply bear the burden of the increased salinity. We request that the issue be addressed in detail and that the economical damage resulting from the increased salinity caused by increased transversion of high quality water be addressed in detail and that no right of way or use permit be issued by the Bureau of Land Management for the Foothills treatment complex without provision for and enforcement of the assignment of the salinity burden and economic damage to the Colorado River Basin water users caused by diversions of high quality water from the Colorado River Basin to the Foothills treatment plant.

---

0 0053

Social
Change
Systems
Inc.

September 23, 1977

Bureau of Land Management
Canon City Office
3080 E Main
P.O. Box 311
Canon City Colorado 81212

To Whom It May Concern:

I would like the following statement to be entered into the officials comments about the Bureau of Land Management's Draft Environmental Statement on the Proposed Foothills Project.

I wish to address my comments to the socio-economic sections of the Draft Environmental Statement for the Proposed Foothills Project. As a consulting sociologist who has been involved in community studies for a decade and in the assessment of social impacts due to large-scale projects for about a half dozen years, I have to call into serious question the adequacy of the socio-economic descriptions, projections, and analyses of this particular EIS.

First, there is no adequate description of the relevant socio-economic conditions, and hence no adequate projections of possible impacts upon them. An adequate socio-economic description of a community would have to include descriptions of its institutions (government, education, religion, economy, recreation, and social services), its underlying cultural beliefs, values, and norms, and how these social features are related to the physical form of the community. Essentially an adequate socio-economic description tells what human life is like just as an adequate physical environment description tells what animal and botanical life are like. The EIS contains far better descriptions of the flora and fauna and the amphibians and Bighorn sheep than of human life!

Second, there is an arbitrary delineation of the impact area in that the EIS confines its investigation largely to the geographic area immediately around the project site. While one cannot state with certainty what the impacts of the Foothills Project would be on metropolitan Denver's population, there is at very least the obligation to investigate that instead of arbitrarily assuming that there will be no population impact. The EIS accepts and adopts the population projections formulated by the Denver Regional Council of Governments. However, those very projections assume, among other conditions, the presence of the infrastructure necessary to sustain the level of population growth projected. So, the EIS is in the self-contradictory position of utilizing population projections which assume infrastructure-construction to argue that infrastructure-construction will not impact population!

1459 Ogden
at Calfax
Denver
Calarada
80218

a non-profit corporation for social research, education, and action programs (303) 832-3526

In light of these incapacitating shortcomings - the total absence of any adequate socio-economic descriptions, projections and analyses, and the adherence to questionable and self-contradictory assumptions - the EIS must be declared utterly useless.

Thank you for the opportunity to express these comments.

Sincerely,

Bernie Jones, Ph.D.,
President

United States Department of Agriculture
FOREST SERVICE
11177 West 8th Avenue
P.O. Box 25127
Lakewood, Colorado 80225

0 0055

September 22, 1977

8430

District Manager
Canon City District Office
Bureau of Land Management
3080 East Main St
P.O. Box 311
Canon City, CO 81212

Dear Sir:

Following are the comments from the U.S. Forest Service, Rocky Mountain Region, on the Proposed Foothills Project Draft Environmental Statement.

Chapter 1 - Proposed Action

Page

1-9 It is not correct to state that the Forest Service has decided to issue a special use permit for rights-of-way. The Forest Service action is to decide whether a special use permit will be granted. Additonally, BLM and FS R-O-W must be compatible; either one R-O-W written jointly or two R-O-W's written so as to not conflict. We suggest that the next to last sentence under United States Forest Service be rewritten to read "The U.S. Forest Service will determine if rights-of-way are to be approved and, if so, the appropriate permits will be granted.

1-31 It is not practical to cut products in this area and sell them to the public due to the area's isolation, steep slopes, size of material, and low product values involved. To be marketed this material would have to be hauled out for the public's access.

1-32 The revised DES appears to have made a major change in the proposed widths for the access road in the South Platte Canyon. As now proposed, the entire roadway would be 22 feet wide. The original proposal, which reflected agreements by several agencies, called for two sections of 14-foot roadway with turnouts (station 247+71 to 275+83 at the Keystone Bridge, and station 340+50 to 350+50). These narrow sections would preserve aesthetically pleasing segments of the road with narrow rock cuts over the old DSP&P railway. It would be difficult, if not impossible, to construct a 22-foot roadway through these sections without unacceptable damage to the rock canyon walls, or the stream, or both. We feel these two segments should be constructed as a 14-foot roadway with turnouts as originally planned. It is not made clear why a 22-foot roadway is necessary for both the Proposed Action (p. 1-32) and the Lower Dam Minor Alternative (p. 8-26), while it is acceptable to upgrade the road to a 14-foot width with turnouts for the Upstream Dam Alternative (p, 8-22).

1-34 1-35 The construction of the staging area will be a serious impact on the Stevens Gulch area. The staging area is given as about 4 acres (page 1-34). The staging area as shown on Figure 1-9 (p. 1-35) is confined between the access road and the rerouted stream and appears to scale approximately 1.7 acres. The question arises as to the size of staging area required by the DWB. If the area can only provide 1.7 acres, will it be adequate, or will they be looking elsewhere for additonal area? Since the staging area will be built within the narrow confines between the road and the stream, the DES should provide more detailed information concerning this area. There appears to be a discrepancy regarding the location of Stevens Gulch stream channel and the existing road. Figure 1-9 (p. 1-35) show the existing road east of the stream channel, while Figure 3-14 shows the road on the west side of the channel.

1-37 The construction of aerial power and telephone lines is indicated. The report later points out that this has substantial adverse visual impact. Aerial lines may be satisfactory on a temporary basis, however, permanent installations should go underground. Forest policy is to bury all telephone lines and powerlines under 32 KV unless there are extenuating circumstances. This is especially important in areas where recreation and aesthetics are key values and public use is very diversified and intense. A recommendation for burial was conveyed from the Forest Service to the BLM on September 27, 1974, in our review and analysis of the proposed Foothills project.

1-38 1-39 The disposal of material from the excavation of the tunnel is discussed somewhat weakly. Forty percent of the tunnel waste, or roughly 57,000 cubic yards, would be generated at the Stevens Gulch portal. This material is to be deposited "in a valley or draw approximately 400 feet from the portal along the road to the top of the dam." Excess material would be hauled to "another disposal site" in the reservoir area. This is a rather vague statement considering the amount of tunnel waste requiring disposal.

Chapter 2 - Description of Present and Future Environment

2-28 On page 2-28 it states the North Fork of the South Platte River was designed to handle a sustained flow of 680 CFS and a peak discharge of 1020 CFS for "short-lived periods." The North Fork flows at about 500 CFS now. An additional 580 CFS is needed to handle the additonal 500 mgd for the new facilities. It would appear that flows would be in excess of present channel capacity in the North Fork. The DES needs a statement that North Fork will be studied prior to increasing flows above 680 CFS, as increasing flows above this amount could result in loss of the limited area suitable and available for recreation. (See pages 2-103 and 3-59.)

2-51 We invite your attention to a potential danger of using a general map to determine averages for project type work. The SCS sediment yield map used for the calculations states, "It should not be used for design purposes at individual local sites." (P2-51 second para.) We question, also, if the same method was used for the calculations in para. 5, P3-27.

2-100 On page 2-100 it indicates that the Bighorn sheep may leave in the future without construction, primarily due to disease and increased human pressure. This may not be an accurate predicition because the status of the sheep is subject to management, in that, intensity of use by people can be controlled. In additon lungworm can be prevented and transplanting is possible.

2-103 The next to last paragraph should be changed to read "...returned to Federal ownership through exchange, purchase or donation."

Chapter 3 - Environmental Impact of the Proposal

3-13 A more comprehensive analysis of impacts and opportunties foregone due to increased flow in the North Fork of the South Platte would be desirable. DWB does have a BLM right-of-way water easement for public lands, however, they must accomplish the project in an environmentally sound manner.

In October 1963 the Denver Water Board agreed to a set of stipulations attached to their easement for the Roberts Tunnel. Stipulation No. 10 states, "If water releases from the Roberts Tunnel are required in an amount that would result in unreasonable or substantial damage to the natural stream channel located within the National Forest, suitable protective devices will be constructed or other preventative measures taken prior to such releases."

3-54 Cultural Resources: It appears that cultural resources have been adequately addressed in this document. It is not clear, however, how thoroughly the potential impact areas have been examined for archeological material. Obviously, some survey has been completed, but this should be clarified.

3-55 We disagree that the integrity of the Keystone Bridge would be "lost either through removal, destruction, modification, etc." The bridge is listed on the National Register of Historic Places as an object, not a site. It was not listed because of its historical significance in place on the old railroad bed. Moving the bridge would still retain integrity of its architecture as would modifications, i.e., building another bridge just downstream.

3-59 The effects of draw-down of 44 feet on Dillion Reservoir would be very substantial in terms of visual and recreation impacts. The report does not adequately analyze and evaluate the implications of this as well as possible measures to mitigate the adverse impacts created.

Chapter 4 - Mitigating Measures

Increased fire hazard due to accelerated activity in the area should be analyzed to determine mitigation measures needed.

Deposition of waste as well as rehabilitation of disturbed sites should be handled on a site specific basis. A rehabilitation plan should be developed for each site disturbing project.

4-3 We suggest the words "during periods of water shortage" be deleted from Item 7 on Page 4-3. Minimum bypass flows should be maintained, especially during periods of water shortage. A statement should be included to guarantee a freshet once a year for 24 to 48 hours if siltation becomes a problem from sustained low flows.

4-5 Since the bridge is located on National Forest lands and is federal property, Forest Service concurrence will also be necessary. Also, will the BLM, or will the Denver Water Board prepate the 106/2b statement?

4-7 The DES should concer R-O-W needs on all governmental lands. Could add a statement to the effect that the BLM will coordinate with all federal agencies to see that R-O-W requirements are consistent with each agency's resource protection requirements.

Chapter 5 - Adverse Impacts Which Cannot be Avoided

5-14 We disagree with comment that the Keystone Bridge would be destroyed. Comments relative to page 3-55 apply here also. The original setting would be changed or modified, but the significance of the bridge (architecture) would only be destroyed by destruction of the bridge.

Chapter 8 - Alternatives to the Proposed Action

In Chapter 8, "Alternatives to the Proposed Action", it is pointed out that the development of terminal reservoirs would minimize recreation use for water quality reasons. A key resource value of public land in this area is recreation. Any proposal for the development of a large reservoir on National Forest land which would exclude intensive public recreation would be questionable, especially on the Front Range.

The report could be strengthened with more evaluation of minor alternatives, especially economics. Three alternatives needing additional evaluation include: a) replacement of the dam access road with a construction elevator, b) road construction standards and operation, and c) powerline and telephone line burial.

Other minor alternatives which should have been considered and evaluated would include a) project access alternatives and b) waste material deposition.

for S. H. HANKS
Deputy Regional Forester, Resources

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
11177 West 8th Avenue
P.O. Box 25127
Lakewood, Colorado 80225

2730

January 6, 1978

Mr. Dale Andrus
Director, Colorado State Office
Bureau of Land Management
Room 700, Colorado State Bank Building
1600 Broadway
Denver, Colorado 80203

Dear Dale,

At our January 5 meeting with you and representatives of the Public Service Company of Colorado and Denver Water Board, we agreed to write you a clarification of the Forest Service position regarding powerline construction on National Forest land. In particular, we are writing regarding the comment on page 9-75 of the draft Final ES for the Foothills Project referring to Forest policy and the statement that "A recommendation for burial was conveyed from the Forest Service to the BLM on September 27, 1974, in our review and analyses of the proposed Foothills project."

This recommendation from the Forest Supervisor of the Pike and San Isabel National Forests is based on coordinating requirements previously approved by this office. These are requirements which are normally considered necessary to accomplish multiple use management objectives, which include visual quality objectives. Variations from policy can be permitted on analysis of specific projects.

I believe this clarification allows, in the subject case, the overhead installation of the powerline as a viable alternative to burial providing that visual impacts are acceptably mitigated through application of proper landscape design techniques in construction. These techniques will be spelled out in detail for adherence by the powerline applicant, should an affirmative decision be rendered on the applications for the Foothills Project.

Members of my staff are scheduled to work with your staff on January 6 to modify those portions of the draft Final ES in a manner which reflects the above clarification.

Sincerely,

Craig W Rupp

CRAIG W. RUPP
Regional Forester

COLORADO CHAPTER of
THE AMERICAN SOCIETY OF LANDSCAPE ARCHITECTS
P.O. BOX 6143, DENVER, COLORADO 80206

0 0058

September 23, 1977

Dave Taliaferro
Team Leader
Foothills Environmental Statement
Canon City District Office, BLM
3080 East Main Street
P.O. Box 311
Canon City, Colorado 81212

Dear Mr. Taliaferro:

In review of the Foothills Draft Environmental Statement we find that there are two areas of critical concern to the Colorado Chapter of the American Society of Landscape Architects (ASLA). These concerns are twofold, including the recreation potential of the Waterton Canyon area and conservation alternatives involving water use and landscape practices.

RECREATION

Chapter 1 Description of the Proposed Action

We find that in Chapter 1, Description of the Proposed Action, there is little mention of the recreation opportunities related to the proposed Strontia Springs Dam with the exception of the road from South Platte to the upper end of the reservoir (page 1-34).

The following questions should be addressed:

1. Will there be any form of access (road or trail) along the edge of the reservoir above the Dam Crest Road?
2. How will the edge of the reservoir be treated?

Until these questions are answered we cannot assess the impacts of this proposal.

Mr. Taliaferro
Foothills Environmental Statement
September 23, 1977
Page two

Chapter 2 Recreation Resources

Discussions on pages 2-80 to 2-81 indicate the uniqueness of the Waterton Canyon in terms of its scenic quality, wildlife, canoeing, fishing, cultural features, etc. Two areas of concern that are not addressed include the recreation values that the estimated 10 000 annual visitors place on Waterton Canyon and the relationship of the canyon to future recreation planning. The following topics should be addressed:

1. Specific use data associated with the Waterton Canyon visitors.
2. Future recreation plans associated with the South Platte River and how they involve Waterton Canyon.

Chapter 2 Future Environment Without the Proposed Action – Recreation Resources

On page 2-102 the demands on recreation opportunities in Waterton Canyon are discussed. In the absence of a management plan by the National Forest Service for the South Platte Planning Unit of the Pike-San Isabel National Forest, how will Waterton Canyon be managed, and what restrictions will be placed on visitor use? What coordination will there be with future recreation planning along the South Platte River?

The recent study completed by the National Park Service and Bureau of Outdoor Recreation indicates that Waterton Canyon is one of the significant resources on the Platte River. Its location in proximity to Denver further enhances its value during a time when natural recreation areas are becoming increasingly important.

Chapter 3 Environmental Impacts of the Proposed Recreation Resources

A better definition of impacts of the dam and reservoir is necessary as they relate to future recreation planning along the Platte River. There is no mention of the impacts on canoeing.

In summary, Colorado ASLA is concerned that the description of the recreation element of the proposed project associated with the Strontia Springs Dam is not fully presented, and that the recreation potential of Waterton Canyon is not sufficiently investigated. A more systematic analysis of recreation user sensitivity, recreation values, use sensitivity, and future recreation planning for the South Platte River in the Waterton Canyon should be provided. Without an adequate description of the proposed action or recreation potential, a complete assessment of the recreation impacts associated with Foothills cannot be established.

Mr. Taliaferro
Foothills Environmental Statement
September 23, 1977
Page three

WATER CONSERVATION

The second area of concern to landscape architects is the almost nonexistence of discussion on the possible effects of water conservation practices and trends being established in respect to better horticultural practices on reducing the need for treated water. We feel you should consider the following items so that the impact could be accurately assessed. Since Denver is growing, the demand for treated water is also going to increase. If the increase continues in the same proportions as in the past, approximately 40% of household water will go toward horticultural needs. Yet, when discussing water conservation BLM deals primarily on inside use conservation which affects 60% of household water, and mention little about how a reduction of the 40% would significantly reduce treated water need.

The rationing program imposed by the Denver Water Board in 1977 was designed to allow a residence to apply 1" of water per week to the landscape area of a typical residence. This action resulted in a 27% reduction in water demand in the three months irrigation season. Until the water restrictions, the only acceptable solution for a lawn was bluegrass. Since water conservation has become a critical issue, we feel other landscape alternatives should be explored. These are trends based partly on an emerging ecological sensitivity to our semiarid climate and drought conditions that have produced water saving techniques never before experienced when there was ample water. These two factors have already encouraged our clients to ask for landscapes that conserve water.

Several techniques, such as proper grading of lawns to reduce runoff and encourage more efficient use of the available water, reduction of lawn areas to ground covers or organic or inorganic mulch, improved irrigation design techniques, low precipitation irrigation heads to allow maximum absorption in clay soil, drip irrigation techniques to apply water directly to a plant have become economically feasible.

Research and testing of how to produce stands of native and introduced grass species which require less care and water have made giant studies in the past few years so that it is now possible to produce an alternative to the water consuming bluegrass lawn.

Proper horticultural practices are now becoming accepted, such as soil preparation which conserves water by allowing deeper penetration of healthy roots and allows a lawn to survive and grow with the 1" of water mentioned as a guide to the Denver Water Board rationing plan.

The traditional practice, in the Denver area, of grading a subgrade builder's soil and laying sod coupled with heavy irrigation has produced lawns only while there was ample water to keep it green. Since the soil is so heavy

Mr. Talieferro
Foothills Environmental Statement
September 23, 1977
Page four

the water often runs off faster than it penetrates, there has been a tremendous waste of treated water.

We feel an investigation of the savings these techniques have made or will make is important before the impact can be assessed as to the continued lifestyle, loss of horticultural investment or trend to continued increase or similar demand of water needed for horticultural use in the Denver Metro Area.

If we can continue to enjoy the horticultural aspect of our lifestyle using less water per household, there will be more water for more people to share. If there is little effort for new planning and design practices and water conservation education (to encourage better horticultural practices) there will be the same demand for 40% of household water to be used outside the home.

We therefore conclude that trends based on the consumer's interest in saving money and industry's interest in this market shows a trend toward water conservation that should be considered in your final draft.

We, as members of a design profession dedicated to conservation of natural resources while adapting man's needs to the land, offer our knowledge and experience to you as members of your advisory panel to help in preparing the final draft of this statement.

Sincerely,

Tim Tetherow

Tim Tetherow
Colorado ASLA Secretary
Chairman of Environmental Affairs

TT:kh

cc: Dean Harper, Colorado ASLA President
Jake Frankhouser, Colorado ASLA Past President
Dave Jensen, Colorado ASLA Vice President
Jay Bright - Trustee
Mark Westlund - Treasurer

---

0 0060

3715 South Niagara Way
Denver, Colorado 80237
September 21, 1977

The District Manager
Bureau of Land Management
P.O. Box 311
Canon City, Colorado 81212

Dear Sir:

I am submitting comments on the Draft Environmental Statement for the Foothills Project. My background is Emeritus Professor of Electrical Engineering, University of Denver, and currently an Engineering Economist for industry.

1) As a minor comment, the Draft ES keeps referring to "kilowatts per hour". This is an incorrect term. The correct term is simply "kilowatts"; the watt is a rate of energy transfer, and its definition already includes the time element.

2) In my opinion the Draft ES is, in general, an adequate document. It should not be repeated, but should be finalized as soon as possible. If it has any deficiencies in its present form, it does not emphasize strongly enough the adverse effects on Denver area economy of the "no action" alternative, or of the "Chatfield" alternative.

3) The "no action" alternative is simply not acceptable to me. If anything Denver's rate of population increase will be higher than previous estimates, and water shortages are going to develop sooner than your Draft ES indicates.

4) The "Chatfield" alternative will require, by your Draft ES figures on energy, additional pumping costs of from $2 million to $8 million per year over the Foothills proposal, whereas the Foothills proposal will generate saleable energy of from $½ million to $2½ million per year. In addition the Chatfield proposal would likely require additional capital investments over Foothills of from $50 million to $100 million, which would result in annual fixed charges of conservatively $5 million to $10 million per year. This means the Chatfield proposal would be costing Denver water users around from $7½ million to over $20 million per year in extra water costs.

5) I urge that the Draft ES be finalized at once, and that the Bureau of Land Management issue the necessary permits so that the Denver Water Board can proceed with the Foothills project immediately. By my calculations the cost of Foothills initial investment is increasing at the rate of $1100 per hour. Continued delay places an intolerable burden on Denver water users.

6) Various environmental groups appear to be advocating rejection of the Draft ES as a delaying and blocking technique to achieve their biased ends, and to control population growth. I submit that this is no way to control population growth. The practical result will be to degrade the standard of living of every one in this area, and population will continue to increase notwithstanding.

Respectfully yours,

Ray M. Wainwright

Ray M. Wainwright, P.E.

---

0 0069

State of Colorado
EXECUTIVE CHAMBERS
DENVER

RICHARD D. LAMM
Governor

September 26, 1977

Mr. Dale Andrus
Colorado Director
Bureau of Land Management
Colorado State Bank Building Room 700
1600 Broadway
Denver, Colorado 80202

Dear Dale:

The enclosed packet of information represents the State of Colorado's comments upon the Foothills Draft Environmental Impact Statement (DEIS).

In tendering the state agency comments on the DEIS, I would like to make it clear that the State of Colorado believes that it is valid for the City of Denver to pursue plans designed to increase its raw water treatment capacity. There has been a great deal of comment concerning whether or not the Foothills plant itself is needed. The State of Colorado does not wish to put itself in a position of second-guessing the citizens of Denver should they choose to bond themselves for the construction of a water treatment facility. Therefore, I would support the construction of a Foothills-type facility.

What does become of state concern, however, are the potential impacts and ramifications of uncontrolled growth in the Denver Metro area. While allowing Foothills to be developed at a certain level will not directly influence the growth of the Metro area, it does symbolize the very real problems that we are facing in this region. While adequate water treatment capacity should be provided for the Denver Metro area, we cannot view the need for water treatment capacity in isolation from our needs for acceptable air quality, for reasonable transportation mobility and for adequate recreational opportunities. The air quality situation is already unacceptable, and further uncontrolled growth will pose an extremely hazardous situation to Denver residents. We conclude that further uncontrolled growth within this region would render our transportation systems bankrupt. It is in the interest of those who support the development of Foothills, as well as those who oppose the facility, for us to focus on the manner in which Denver continues to grow.

In reading the state agency comments, there appears to be a number of deficiencies in the Draft Environmental Impact Statement. As in all cases, the purpose of a Draft Statement is to discover areas that should be further addressed in a Final Environmental Impact Statement. We are forwarding these comments in the spirit of seeing that an adequate Final EIS is expeditiously

---

Mr. Dale Andrus
September 26, 1977
Page 2

produced by the Bureau of Land Management. It is important that this Environmental Statement be able to withstand legal challenges because we cannot afford to see further delay by virtue of continuous legal challenge to the adequacy of the Environmental Statement.

For this reason, we are hopeful that any inadequacies of the present Draft Environmental Impact Statement are corrected as expeditiously as possible. Further, before the Bureau of Land Management makes a determination as to whether or not a permit should be issued for the construction of a Foothills facility, it would be important for all parties, including state government, to review the size and timing of such a facility in light of the clear need for this region to embrace aggressive water conservation opportunities as well as the necessity of addressing Denver Metro growth problems.

Sincerely,

Richard D. Lamm
Governor

STATE OF COLORADO RICHARD D. LAMM, Governor

DEPARTMENT OF NATURAL RESOURCES

HARRIS O. SHERMAN, Executive Director
Gerald O. Sjaastad, Deputy Director
David W. Walker, Assistant Director
1313 Sherman St., Room 718, Denver, Colorado 80203 892-3311

Board of Land Commissioners
Division of Administration
Division of Mines
Division of Parks & Outdoor Recreation
Division of Water Resources
Division of Wildlife
Geological Survey
Oil and Gas Conservation Commission
Soil Conservation Board
Water Conservation Board
Mined Land Reclamation

September 29, 1977

Mr. Phil Schmuck
Division of Planning
1313 Sherman Street

RE: Department of Natural Resources, Executive Director's Office-Comments on Foothills EIS

Dear Mr. Schmuck:

Five separate agencies of this department (Divisions of Wildlife, Parks and Outdoor Recreation, Geological Survey, Water Resources, and the Water Conservation Board) have previously submitted comments on the draft environmental impact statement for the proposed Foothills water treatment facility. We would like to add some additional observations and comments.

We have examined numerous population projections for the Denver Metropolitan area to the year 2000. Although the DRCOG figures used in the Foothills EIS are the most widely accepted projections, we note that both higher and lower populations are projected by other studies or units of government. We can only conclude from the various projections that the Denver metropolitan area will outgrow the currently available water treatment capacity at some time in the future. Although it is not possible to pinpoint the exact date when additional capacity will be needed, we think that the initial phase of the proposed Foothills plant is justified because of the anticipated demand, and because of the energy conservation aspects of the proposal. We hope that such a facility will be constructed in a timely and environmentally sensitive manner.

While we endorse the construction of the initial phase of the Foothills water treatment plant, we must also recognize that any problem involving the allocation of a relatively scarce resource has two basic dimensions-supply and demand. In meeting the treated water needs of the Denver area in the future, we must look to both augmentation of supply, and management of demand. These two concepts are not mutually exclusive but are in fact complementary in any well managed system. We urge that the final EIS look more closely at the concepts of water conservation and water demand management, including metering, control of peak demands, and installation of water saving devices.

From a functional point of view, an acre foot of water conserved or saved is the same as an acre foot of newly developed or treated water. However, from an economic point of view, and from an environmental point of view, the two are not necessarily the same. Without prejudging any comparison of environmental and economic costs of conservation vs. environmental and economic costs of augmentation of supply, we strongly believe that the demand management concept deserves far more attention than it has received in the draft EIS. In our view, the final EIS could give the Denver Water Board the opportunity to carefully examine the optimum timing, size, and staging of the proposed plant. Water conservation measures could prove to be alternatives to the later stages of the Foothills facility, or they might simply prolong the time before the additional stages are required. In the final analysis, we believe that providing water to the growing Denver metropolitan area should be the result of policies affecting both water supply and water demand.

As part of the ongoing state water policy study, we commissioned a comprehensive report on water conservation and related concepts by the Industrial Economics Division of the Denver Research Institute. We have attached a copy of this report, entitled "Reducing Municipal Water Demand", in the hope that it will be included in the final EIS as part of our comments. We think this report would be of assistance to BLM in preparation of the final EIS, and in assessing the size and timing of the various stages of the proposed Foothills facility. Highlights of the DRI report, and some of our own observations are set forth below.

Management of Peak Demands

As pointed out in Chapter 8 and in table 2-4, of the draft EIS, a substantial amount of the water treatment capacity of the Denver system exists to meet peak demands which occur in mid-summer when everyone is watering their lawns, with more than 50% of treatment capacity lying idle during the other ten months of the year. The EIS has not considered the option of managing the peak demands for water, in order to more efficiently use the existing treatment capacity. Peak demand problems are not unique to water systems, and planners in other functional areas such as electric utilities and highways are beginning to question the expenditure of public capital for the construction of facilities which are used only a few times a month or a few times a year. Electric utilities are beginning to develop strategies to cut the peak electric demand, using such devices as ripple control, voltage reductions, time of day pricing, automatic shutoff of certain appliances, etc.

We do not know the techniques, or the results of peak management of water demand, but we firmly believe it deserves attention in the final EIS. We also think that the final EIS should examine the related concept of additional treated water storage and increased reliance upon that storage.

Metering

The Foothills draft EIS does not consider the effects of metering on the short range or long range need for additional treatment capacity. The EIS does not contain information sufficient to allow us to understand how metering would help Denver meet its water needs in the future. It would be helpful to have this information in the final EIS.

The attached report concedes that the water savings from metering are difficult to calculate. However, it also says:

> A survey of cities which implemented extensive metering systems was conducted in 1973 by American City magazine. Part II of that study cites several case studies where water consumption fell 20 to 50 percent after complete metering. Data indicate that the domestic (in-house) use of water decreased by 30 percent when Boulder installed universal metering in 1965 and that use for sprinkling decreased by 230 gallons per dwelling unit per day. In 1975, Boulder's total per capita demand was still, on the average, 26 percent lower than pre-metered consumption levels. This report will assume 25 percent savings in per capita water demand from installation of meters. (DRI report, p. 34)

Installation of meters and billing procedures thereafter, are of course not free. The Water Board estimates an average cost of $350 per dwelling unit for the installation of meters, for a total cost of about $30 million for the metering of the 89,000 unmetered residences in Denver. Using these cost estimates, and the Water Board's own unpublished figure that metering will save 18,000 acre feet per year, results in a cost per acre foot of water saved of about $1700. In contrast, the cost of an acre foot of developed water (water supply, treatment, storage, and pumping) is more than $2000 in the 1975-80 period, based on 1975 figures in "Metropolitan Water Requirements and Resources 1975-2010". By the year 2000, the cost of an acre foot of developed water is more than $3700. Furthermore, the $30 million estimated cost for installation of meters may be high. The DRI report notes that water meters installed in the house, with an exterior readout, cost about $150, and the water board has said that about 35% of the unmetered taps in Denver could be metered in such a fashion.

Pricing

According to page 29 of the attached DRI report:

> For a water supply agency seeking to motivate more efficient use of water, "nothing is as simple, comprehensive and effective as the pricing mechanism." Changes in the price of water will affect the amount of water which a consumer will buy and use in various activities. Theoretically, he will continue to purchase additional water until the marginal price equals the marginal benefit to him in the function in which he is using it. The relationship between the change in the quantity of a good demanded demand and its causative change in price is known as price elasticity of demand. Although available information is limited, demand for domestic water does exhibit some degree of price elasticity. A change in pricing structure can therefore be an effective means to reduce discretionary water use in a semiarid region.
>
> The pricing mechanism is especially attractive as a use reduction tool because decisions on the degree of reduction are left to the individual consumer. The effects of implementing a new rate structure are likely to be almost immediate, the environmental impact is negligible and the benefits to be derived, in terms of optimal use of existing water and reduced demand for future resources, could be quite substantial.

The experience of Grand Junction, Colorado during the drought summer of 1977, shows that pricing is an extremely effective tool in reducing demand. However, as noted in the DRI report, "...meters are a prerequisite to any form of pricing system beyond the usual flat rate structure." (p.30) In any event, it would be helpful for the final EIS to look at various pricing mechanisms as one way of reducing water demand.

Lawn Irrigation

County extension agents and other experts generally agree that many Denver residents can overwater their lawns. There is widespread agreement that one inch of water per week is sufficient for a healthy, green lawn, and that overwatering is not only a waste of water, but detrimental to the lawn itself. The 1977 water use data, when compared to 1975 and 1976 figures shows that there probably is substantial overwatering of lawns in the metropolitan area. We must begin to find ways to reduce overwatering, because by doing so, we reduce the need for additional treatment capacity. In general, we support the DRCOG position on this matter as follows:

> THE COUNCIL BELIEVES that lawn irrigation practices could and should be changed, where possible, to conserve water. Ways to reduce the use of water on a sustained basis should be adopted

as a way of life by all Denver area citizens, while not drastically affecting the quality of life of the citizens of the region...(DRCOG position statement on Foothills, P. 1.)

In summary, we believe that anticipated growth in the Denver metropolitan area will require additional water treatment capacity, and we thereby endorse construction of the initial phase of the Foothills plant. At the same time, however, we urge that the EIS carefully consider various means of managing or reducing the demand for treated water, without affecting the quality of life in the area. We believe that various means of managing peak demands, and numerous ways of reducing municipal demand, particularly the demand for irrigation water, should be examined by the EIS.

We hope that you will find these comments useful in your preparation of the final EIS. We appreciate the opportunity to review and comment on the Draft Impact statement of the proposed Foothills water treatment facility.

Sincerely,

Harris D. Sherman
Executive Director

HDS:tq
Attachment

RICHARD D. LAMM
Governor

C.J. KUIPER
State Engineer

DIVISION OF WATER RESOURCES
Department of Natural Resources
1313 Sherman Street - Room 818
Denver, Colorado 80203
Administration (303) 892-3581
Ground Water (303) 892-3587

September 14, 1977

MEMORANDUM

TO: PHILIP H. SCHMUCK, DIRECTOR, COLORADO CLEARINGHOUSE

FROM: C. J. KUIPER, STATE ENGINEER

SUBJECT: FOOTHILLS PROJECT, DRAFT ENVIRONMENTAL IMPACT STATEMENT

In accordance with your directive and the work plan of the Department of Natural Resources (designated lead agency), we have reviewed the above referenced Environmental Impact Statement and the following comments are presented for your consideration:

1. In general, the statement is well written and documented for the 125 mgd level of diversion and treatment; however, at the 500 mgd level of diversion and treatment, certain impacts are not assessed as can be seen in Table 5-6.

2. The proposal to exchange transmountain sewer effluent with senior water users on the South Platte River downstream of Denver as set out on page 3-17 is vague and does not provide enough information to adequately assess the increase in water supply as a result of "exchange". The exchange criteria as administered in the South Platte River would require replacement of the entire amount of water diverted out of priority so that the increases in water supply as a result of "exchange" in Concepts A, B and C are not clear.

3. It would appear that the minimum streamflow release of 60 cfs in the summer would be about all the water in the stream from Strontia Springs to the Platte Canyon Intake Diversion Dam during low flow periods such as was experienced this entire summer. No projections of monthly flows when operating under the exchange plan are provided in the statement; although Table 3-5, which is missing in the statement, may contain this data. If it does not, then the statement should be revised to include a table to show monthly streamflows in this reach as a result of the proposed "exchange" of 112,000 acre-feet of water to the Strontia Springs Dam.

---

4. The Strontia Springs Dam site is considered to be a safe location for the construction of a thin-arch concrete dam. The final design of the dam has not been completed and our review of the final design has not been initiated.

C. J. Kuiper
State Engineer

CJK/HDS/pjl

cc: W. G. Wilkinson, Div. Eng.

STATE OF COLORADO
Richard D. Lamm, Governor
DEPARTMENT OF NATURAL RESOURCES
Harris D. Sherman, Executive Director

DIVISION OF PARKS AND OUTDOOR RECREATION
1313 SHERMAN #618, DENVER, CO. 80203
GEORGE T. O'MALLEY, JR., Director

PARKS AND OUTDOOR RECREATION BOARD:
Marvin Elkins, Chairman
Herbert I. Jones, Vice-Chairman
Rowena Rogers, Secretary
Richard G. Beidleman, Member
Sara D. Duncan, Member

DATE: September 15, 1977

TO: Philip H. Schmuck, Director
Colorado Clearinghouse

FROM: George T. O'Malley, Jr.

RE: Comments - Foothills Project Draft EIS

I. Policy/Position Comments

As the State's outdoor recreation agency, the Division of Parks and Outdoor Recreation has a dual interest. First, to provide and/or promote a diversity of outdoor recreation opportunities, and second, to serve the greatest number of people. As proposed, the Foothills project would not interfere with any specific goals or plans, though the difference in recreation benefits between the project as proposed, no project, and the Chatfield alternative are varied and significant. Waterton Canyon clearly offers and now provides for a variety of recreation uses. The construction of Strontia Springs dam and reservoir would, it appears, diminish the existent and potential recreation diversity. Chatfield Reservoir, on the other hand, is planned to (and currently does) accommodate large numbers of front range recreationists. In light of this, the issue may be recreation diversity vs. maximum accommodation. Upon our review of the Draft Environmental Impact Statement, we find the Chatfield alternative unacceptable from a recreational loss point of view, as well as an energy consumptive one. (Reference here is made to the electrical energy needed for pumping.)

While the proposed treatment plant would abut the planned Roxborough State Park, no measureable impact is expected by the location of the treatment facility in this area of anticipated growth.

II. Evaluation of the Impact Analysis

We have found the adequacy of the Draft EIS to be good, overall, though we note the following deficiencies as we see them regarding:

(1) Project as Proposed. We are not confident with the recreational assessment of Waterton Canyon, as described in the EIS. Our first reaction to the 10,000 annual visitation figure noted in the EIS is that it looks low, though we have nothing more solid to challenge the figure with. The validity of such data could only be determined by a one year sample testing period whereby site specific recreation data could be gathered.

Again, we are not confident that mitigating measure #10 (i.e., 2.5 miles of non-motorized access trail around Strontia Springs Reservoir) will "totally eliminate recreation losses" of the canyon, as stated in the EIS, p. 4-13.

(2) Chatfield - major alternative. We have found an insufficiency of data regarding the problems associated with this alternative, as well as what (if any) positive recreational effects this alternative may offer. Not having this information hampers a valid comparison of recreation benefits of the canyon vs. Chatfield. In particular, the Draft EIS fails to indicate the huge financial investments for recreation which have occurred at Chatfield.

We have found a conflict of figures in the environmental impact statement regarding what the s.a. available for recreation would be with this alternative, i.e. 1,300 s.a. cited on p. 2-103, and 1,150 s.a. cited on p. 8-83. Though recreation values of the canyon are described, they are not compared with those of Chatfield. As a major alternative to the project, this is necessary to our evaluation.

III. Assuming approval of the project as proposed, we submit the following suggestion:

(1) That measures be taken to mitigate recreational use issues due to the expected mud flats resulting from drawdown at Dillon Reservoir.

CS:yd

STATE OF COLORADO
Richard D. Lamm, Governor
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
Jack R. Grieb, Director
6060 Broadway
Denver, Colorado 80216 (825-1192)

September 19, 1977

TO: Colorado Department of Natural Resources

FROM: Colorado Division of Wildlife

SUBJECT: Foothills Project Draft Environmental Impact Statement

These are Staff comments regarding the DES which covers the proposed Foothills Project.

We are hopeful they will prove useful in the preparation of the Departmental comments. We offer our assistance on the fish and wildlife sections if it is needed.

JRG:cs
Enclosure

DEPARTMENT OF NATURAL RESOURCES, Harris Sherman, Executive Director • WILDLIFE COMMISSION, Thomas Farley, Chairman
Sam Caudill, Vice Chairman • Roger Clark, Secretary • Jean K. Tool, Member • Vernon C. Williams, Member
Jay K. Childress, Member • Michael Higbee, Member • Wilbur Redden, Member

---

FOOTHILLS PROJECT COMMENTS

Colorado Division of Wildlife

These comments are in addition to and an update of the preliminary comments that were previously submitted. Specific comments are as follows:

Page 1-30, Para. 1: States stream will be dewatered during construction but does not say what time of year, for how long a period and what, if anything, will be done about the fish in the stream.

Page 1-34, Para. 3: What is meant by most of the workers being bussed, over 50 percent? Apparently, there were bighorn sheep poaching problems by construction workers during the Rampart Project construction. Mass bussing should discourage poaching by workers.

Page 2-17 - Roberts Tunnel System. This paragraph mentions "stabilization" of the North Fork channel by the Denver Water Board. Roberts tunnel has a capacity of 1000+ c.f.s. so would not further channel changes be required to supply the planned Foothills plant and if so, in what manner? This particular "stabilization" certainly did not improve the fishery habitat.

Page 2-23 - Dillon Reservoir. Should not the future operation, drawdown, of the reservoir and releases down the Blue River and probable impacts if changes occur be discussed?

Page 2-28, North Fork of South Platte flows. The capacity of the upper reach of the channel has been designed for a peak of 1,020 c.f.s. Is this a functional design without an increased capacity in the lower section? Stream improvement devices should be considered for mitigation of stream habitat losses.

Page 2-37, Para. 1: Diversion structures do have impacts dependent upon how much and when the water is diverted.

Page 2-37, Para 2: Natural reproduction is very limited in the "stabilized" section of the North Fork where limited data indicate natural reproduction did occur.

Page 2-58 and 2-59: Some additions and changes of the species list may be requested for the Final Environmental Impact Statement.

Page 2-60, Bighorn Sheep. Here again, some changes may be requested for the FES if new data are available. This is also true for the other listed species.

Page 3-13, Colorado River Watershed. It would appear this 125 mgd proposal may have some impact perhaps not on the watershed but on individual streams.

Page 3-14, last paragraph: Average flows are often cited but are of little value unless maximum and minimum flows are also included.

Page 3-22, Para. 2: Trying to estimate actual pounds loss is conjecture at best. Perhaps impacts on habitat would be better.

Page 3-22, Para. 3: Biomass is not important if the change is from a value to a no value or worse; trout for suckers. What may happen is discussed on page 3-24.

Page 3-33, Wildlife: It is difficult to predict actual impacts but the discussion appears to be plausible. The section on golden eagles could be questionable.

Page 4-3, #7: As previously stated, we are very concerned as to whether these flows of 30 and 60 c.f.s. can be maintained in this excellent fishery below the dam. This flow should be guaranteed so it cannot be altered by water exchanges, etc. The last sentence, as stated, is bothersome.

Page 4-3, #8: We concur with the stream improvement proposals but feel maintenance of the structures should also be included in the stipulations.

Page 5-19, Table 5-6: Appears to be adequate if some minor changes are made.

Page 7-1, Para. 3: We assume the development of additional raw water will be covered by a separate EIS.

Page 8-36, Two Forks Reservoir. Here again, we would assume a separate study would be made.

Page 8-47, Aquatic Resources. The South Platte has to be extemely productive to remain largely self-sustaining considering location and fishing pressure.

Page 8-50 and 51, Wildlife Species. Some minor changes may be requested during the preparation of the EIS.

Page 8-58-119, Analysis of Environmental Impacts. It appears coverage is adequate considering the scope of this section which covers possible future water developments by the Denver Water Board. Here again, we believe each proposed segment should be examined separately before development occurs.

In general, we feel the EIS attempts to give adequate coverage of and to fairly evaluate the probable impacts of the Foothills proposal. In some cases, we do not agree but we realize it is rather difficult to predict actual impacts on a given species. To reiterate, our three main concerns are:

1. What will the impacts be on those wildlife species which will be most directly affected, such as bighorn sheep.

2. Can minimum flows, 30 and 60 c.f.s., for the South Platte River below the Strontia Springs diversion dam,be delivered.

3. Will there be further modification of the North Platte to carry increased flows from the western slope and if so, what will be done as mitigation.

   The Wildlife Commission is on record as being opposed to construction of the Two Forks Project and also concurred with the U.S. Fish and Wildlife report (pages A-3-7) to the BLM which recommends denial of the Right-of-way permit to construct the Strontia Springs Dam. Both these 1975 Commission actions were premished on the conclusions that the proposed remedial actions would not mitigate the probable losses of fish, wildlife and their habitats.

Minor corrections in wording may be suggested by the Division of Wildlife team member during preparation of the FES.

We appreciate being given the opportunity to review and comment on the DES.

COLORADO DIVISION OF WILDLIFE COMMENTS
FOOTHILLS PROJECT
DRAFT ENVIRONMENTAL STATEMENT

These are draft or preliminary comments, subject to change, as several of the Staff have not finished their review of the document. We will submit our official comments after the September 14 Public Meeting.

In general, we feel the DES coverage of Fish and Wildlife to be adequate but we probably will request some additions to the species list and some change in wording. Some feel poaching of bighorn sheep may become a problem, during the construction period, if our enforcement people have only limited access to the area. Impacts on the bighorn habitat may also be greater than conjectured.

We are becoming increasingly concerned as to whether adequate flows can be maintained, especially during the winter, in the South Platte below the dam. It would be an irreparable loss if the reach of the stream to Chatfield were to be dewatered or damaged as much of it is a quality trout stream. In this connection, we assume the last sentence, first paragraph, #7 page 4-3, "The bypassing of this water . . . will be given consideration . . . its future projects by BLM.", does not mean that changes may be made for Foothills or at Two Forks, if it were to be constructed, but some clarification of this statement should be in order. Maximum flows should be associated with minimum flows and should be designated,as large, sudden releases can also cause extreme damage to an aquatic habitat. Stream flows are always a reminder of what will probably happen to the North Fork of the South Platte if the treatment capacity at Foothills is expanded to 500 mgd and what will be done as mitigation if channeling or stream degradation does result.

Chapter 4, Mitigating Measures, covers plans for aquatic habitat, recreation, etc., but apparently does not consider loss of terrestrial habitat. Perhaps, some thought should be given to this type of mitigation.

The DOW Commission is on record as being opposed to the construction of the Two Forks Project. We do not know if the Commission considers Foothills to be a part of the Two Forks Project since it has not been discussed.

To repeat, these comments are preliminary and should not be considered as final. We will submit our official comments after the September 14 public meeting. We will also have a representative serving on the FES team so we are hopeful we can clarify some of the statements in the wildlife section of the FES.

THE STATE HISTORICAL SOCIETY OF COLORADO

Colorado State Museum, 200 Fourteenth Avenue, Denver 80203

September 1, 1977

Mr. Philip H. Schmuck
Director, Colorado Clearinghouse
Colorado Division of Planning
520 State Centennial Building
1313 Sherman Street
Denver, Colorado 80203

RE: Proposed Foothills Project Draft Environmental Statement

Dear Mr. Schmuck:

We have received the Draft Environmental Statement prepared by the Bureau of Land Management (BLM) and have reviewed it for potential impact upon architectural, archeological, historical and cultural properties.

It is our understanding that compliance with the environmental impact provisions of Section 102(2)(c) of the National Environmental Policy Act and regulations thereunder should include compliance with Section 106 of the National Historic Preservation Act of 1966, as amended. The Foothills project statement is not complete in that it does not contain evidence of full compliance with the National Historic Preservation Act.

However, the BLM is proceeding with the consultations required in the Advisory Council on Historic Preservation's regulation, 36 CFR Part 800, to establish compliance with the National Historic Preservation Act. We look forward to working expeditiously with the BLM in this process to afford consideration for all cultural properties that may be located within the potential environmental impact area of this project.

Please contact James Hartmann or Michael Quinn on the staff of the State Historical Society at the Colorado Heritage Center, 1300 Broadway, 892-3394, if we may be of assistance in this matter.

Sincerely,

Walter A. Steele

Walter A. Steele,
Acting State Historic Preservation Officer
for Douglas and Jefferson Counties.

STATE DEPARTMENT OF HIGHWAYS

JACK KINSTLINGER EXECUTIVE DIRECTOR

DIVISION OF HIGHWAYS
E. N. HAASE
CHIEF ENGINEER

COLORADO STATE PATROL
COL. C. WAYNE KEITH,
CHIEF

STATE OF COLORADO

4201 EAST ARKANSAS AVENUE • DENVER, COLORADO 80222 • (303) 757-9011

September 12, 1977

Mr. Philip H. Schmuck
Director
Colorado Division of Planning
520 Centennial Building
1313 Sherman Street
Denver, Colorado 80203

Dear Mr. Schmuck:

The Colorado Department of Highways has conducted an interdisciplinary review of the Draft Environmental Statement (DES) regarding the Proposed Foothills Project, prepared by the Bureau of Land Management. Our concerns are presented here in the format suggested in the EIS Review Work Plan.

The Department of Highways finds the Foothills Project DES to be inadequate in a number of aspects, the most critical being:

1. Failure to conform with the Council on Environmental Quality's (CEQ) guidelines for the preparation of environmental impact statements and the Bureau of Land Management's (BLM) guidelines for the preparation of environmental statements;

2. Failure to adequately consider the secondary impacts of the proposed project;

3. This Department, as other federal, state and local agencies, must rely upon a coordinated planning base. There is a paramount need for consistency amongst the many developing and adopted plans which intend to use limited natural resources, financial resources and physical land resources. The Foothills DES does not demonstrate the consistency of the proposed project with related plans and programs;

4. Failure to demonstrate that the proposed action conforms to the State's Air Quality Implementation Plan (SIP);

5. Inadequate assessment of alternatives to the proposed project;

6. Use of the assumption that the proposed project would not alter population growth and development patterns in the Metropolitan area;

7. Failure to adequately address the relationships between the 125 mgd and 500 mgd facility, and new sources of raw water; and

8. Failure to respond adequately to the comments provided from review of the proceding DES of January, 1976.

Discussed below are each of the eight concerns. Regarding Item 1, Conformity with CEQ and BLM Guidelines and Item 2, Secondary Impact Assessment.

Based on a review of the Council on Environmental Quality's guidelines for the preparation of environmental impact statements, (Code of Federal Regulations Title 40, Chapter V, Part 1500) and the Bureau of Land Management's guidelines for the preparation of environmental statements (Bureau of Land Management Manual #1792 "Environmental Statements") the Draft Environmental Statement for the Proposed Foothills Project prepared by the Bureau of Land Management is seriously deficient. Both sets of regulations governing the preparation of environmental impact statements clearly call for full consideration of the secondary impacts of a proposed action (Sec. 1500.8(a)(3)(ii) and 1792.44E3 b(3)-(7), CEQ and BLM respectively). Section 1500.8(a)(3)(ii) states:

> Secondary or indirect, as well as primary or direct, consequences for the environment should be included in the analysis. Many major Federal actions, in particular those that involve the construction or licensing of infrastructure investments (e.g. highways, airports, sewer systems, water resource projects, etc.) stimulate or induce secondary effects in the form of associated investments and changed patterns of social and economic activities. Such secondary effects, through their impacts on existing community facilities and activities, through inducing new facilities and activities, or through changes in natural conditions, may often be even more substantial than the primary effects of the original action itself. For example, the effects of the proposed action on population and growth may be among the more significant secondary effects. Such population and growth impacts should be estimated if expected to be significant (using data identified as indicated in 1500.8(a)(1) and an assessment made of the effect of any possible change in population patterns or growth upon the resource base, including land use, water, and public services of the area in question.

The DES in question however does not address the impact that an increase of 500 mgd of treated water would have on metropolitan settlement patterns, the demand for transportation and other urban services, or the potential for further degradation of the metropolitan area's air quality. The DES assesses impacts almost exclusinvely within the immediate geographic area of the proposed treatment plant and related water diversion facilities. Such narrow perspective is both technically and legally insufficient.

The omission of 500 mgd analysis is also in direct conflict with BLM environmental statement guidelines. BLM Manual 1792.44E3 b(6) states that:

> (6) If an impact is not well understood, a range of likely impacts may be stated. The text must indicate where data are not available to analyze a suspected impact. Where facts or previous experience are not available, the analyst must use his professional knowledge to predict the impacts. However, always identify those situations where professional judgment was used as the basis for the analysis of the potential impacts. Studies and research which back up statements of impact conclusions are not included in the text, but must be referenced and only concise, pertinent data used in the text.

Table 2-33 "Summary of Existing and Future Environment" and 3-16 "Summary of Environmental Impacts of the Proposal" contain numerous conspicuous blanks accompanied by footnotes which state that information was not available. In order to be consistent with 1792.44E3 b(6) expert opinions at least should have been used. Also, it should be recognized that BLM is subject not only to provisions of Section 102 of NEPA (environmental assessment) but also Section 101 (enhancement and protection of the human environment). Therefore, to be adequate the DES needs to include assessment of secondary impacts and commitment to mitigate negative impacts.

The DES must also be deemed deficient in its treatment of the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, (Chapter 6 of the subject DES). BLM Manual 1792.44E6 directs that the environmental statement should "also discuss the cumulative long-term impacts of this action combined with the impacts of all other known actions (occurring or planned in the area) with similar environmental impacts."

Regarding Item 3: Consistency with Other Plans

In light of the preceding discussion, it seems that the cumulative effects of the Foothills Project amd the eight wastewater treatment plants and the Clean Water Plan (the subject of the Denver Regional Environmental Impact Statement for Wastewater Facilities and the Clean Water Program prepared by EPA Region 8, June, 1977) should have been examined. The DES also does not address the environmental and socioeconomic impacts of further transmountain water diversions on the long-term development and productivity of the Western Slope.

The DES also did not comply with CEQ's requirement under Sec. 1500.8 a(2) for discussion of:

> (2) The relationship of the proposed action to land use plans, policies, and controls for the affected area. This requires a discussion of how the proposed action may conform or conflict with the objectives and specific terms of approved or proposed Federal, State, and local land use plans, policies, and controls, if any, for the area affected including those developed in response to the Clean Air Act or the Federal Water Pollution Control Act Amendments of

> 1972. Where a conflict or inconsistency exists, the statement should describe the extent to which the agency has reconciled its proposed action with the plan, policy or control, and the reasons why the agency has decided to proceed notwithstanding the absence of full reconciliation.

In one instance the document did attempt to discuss the relationship between the proposed project and land use plans for Douglas County. Unfortunately the analysts working on this DES were not aware of the fact that the plan they referred to was declared null and void by the Douglas County Commissioners on February 11, 1975.

It is important that the DES be revised to include consideration of all existing and proposed local and regional land use, transportation, water quality, air quality, and other plans, policies, and programs.

This discussion of plan and policy relationships should include examination of the DRCOG Draft Regional Growth and Development Plan for the Denver Region (July, 1977) and of the results of the DRCOG Transportation Plan Restatement. The March 17, 1977 Study Design prepared by DRCOG for the Transportation Plan Restatement addresses the concerns:

> ...whether the current growth and development policy for the Region is the most appropriate policy, considering the increased level of air pollution reported in the 1976 Air Quality Consistency Statement and the overall cost of providing public and private facilities to accommodate this anticipated growth. This issue needs to be addressed, first through the assessment of the current growth and development plan, and then, if necessary, through the development and evaluation of other growth and development plans, which are more consistent with air quality policies and available financing.

Regarding Item 4: Air Quality

The consideration and analysis of the impact of the Foothills Project on air quality in the Denver Metropolitan Region is grossly inadequate. The exclusion of the secondary impacts of Foothills on air quality is unacceptable. In addition, the DES contains several false statements regarding present and future air quality in the region. The DES cites a 1974 Environmental Protection Agency (EPA) study which concluded that:

> ...air quality in the Denver area could be improved also if the Air Quality Maintenance Plan (EPA 1974) is successful. By 1981, carbon monoxide emissions would be reduced to an allowable level for human health, and by 1988, total vehicular emission of hydrocarbons would be reduced to limits allowable for human environments (EPA 1974). (p. 2-101)

The EPA Study cited is outdated and has been superceded by several more recent studies which were available when the DES was being prepared including: Report to the Public: 1976, Air Pollution Control Commission (APCC, 1976), and Air Quality Assessment Statement (CY, 1976) and Addendum, Joint Regional Planning Program (JRPP), December 9, 1976, and February 24, 1977. In contradiction to the EPA study these reports both demonstrate that carbon monoxide

concentrations will increase through 1980 and continue to exceed federal health standards through the year 2000. These more recent APCC and JRPP reports show that in 1980 the concentration of carbon monoxide will exceed the federal health standard by 400%. These reports also demonstrate that ozone (hydrocarbon) concentrations will continue to exceed federal health standards through the year 2000. The DES also incorrectly states that "Present emission of nitrogen dioxide concentrations exceed federal health standards, and that this will continue through the year 2000.

The recently adopted Clean Air Act Amendments of 1977 delay new car emission standards which will result in even higher carbon monoxide, ozone (hydrocarbon) and nitrogen dioxide concentrations.

Section 176(c) of the Clean Air Act Amendments of 1977, states that:

> No department, agency, or instrumentality of the Federal Government shall (1) engage in, (2) support in any way or provide financial assistance for, (3) license or permit, or (4) approve, any activity which does not conform to a plan after it has been approved or promulgated under section 110. No metropolitan planning organization designated under section 134 of title 23, United States Code, shall give its approval to any project, program, or plan which does not conform to a plan approved or promulgated under section 110. The assurance of conformity to such a plan shall be an affirmative responsibility of the head of such department, agency, or instrumentality. (emphasis added).

Therefore the BLM is required to demonstrate that the proposed action is in conformance with the State's Air Quality Implementation Plan (SIP). The Final Environmental Statement must address the consistency of the proposed action with the SIP.

Regarding Item 5: Alternatives

The DES provides an extremely inadequate and inappropriate assessment of alternatives to the proposed action. The law and federal guidelines clearly indicate the Environmental Statement is not to be used to advocate or recommend a particular action, but must assess a variety of reasonable alternatives, including the alternative of doing nothing, equally and objectively. Alternatives should be identified at the beginning of the Statement, and all alternatives should be subjected to the same form of analysis and evaluation.

The assessment of conservation in conjunction only with the no-build alternative is particularly distortive and technically incorrect. The "conservation" program described does little more than depict the dire consequences of not implementing the Denver Water Board (DWB) proposal. The study ought to determine whether a conservation program, alone or in combination with each other alternative, could or could not serve the needs of Denver water consumers as effectively as the proposed DWB project or any of the other alternatives described. This is not to say that conservation is the ideal or the only solution to Denver's water problems; but simply that the DES has not given an objective and fair assessement of the alternatives available to the Denver region.

The DES also fails to provide consistent and explicit measures for comparing costs, benefits, and impacts of the various alternatives. At the least, the DES should include a "balance-sheet" type of cost-effectiveness analysis which provides direct (and, as much as possible,quantitative) comparison of the specific costs, benefits, and impacts of each alternative with all others.

Regarding Item 6: Assumptions

The use of a single projection of population growth and of water consumption patterns, provided by DRCOG, is technically inappropriate. The assessment of long-range consequences of the proposed action and its alternatives (required by NEPA) should be based on a range of different, plausible assumptions, or "alternative futures". Given that demographic projections have a history of being almost uniformly incorrect, this use of a single population projection as a basis for long-range impact assessment is indefensible. The DES fails even to identify and critique the assumptions on which the DRCDG population projection is based.

The secondary impacts of enhancement of growth potential was excluded from the analysis. This was due to the untenable assumption that the project would not alter population growth. Water availability was determined to have no effect on the developability of land. Justifying the Foothills Project on expected population growth which in itself is based on the assumption of no water constraints is a circular argument.

Regarding Item 7: Complete System

The issue of segmentation of the proposed project which caused revision of the original Environmental Statement has not been resolved in the new DES. The DES fails to demonstrate clearly whether the 125 mgd treatment facility is considered by BLM and DWB to be functionally and economically a self-sufficient project or is inextricably linked to expansion to a 500 mgd facility. The comments from statewide review of the previous DES (March 1, 1976) showed the development of the 125 mgd facility alone to not be cost effective. The DES also does not adequately show where and for what purposes the additional 500 mgd facility will be utilized. The ruling of the Regional Solicitor of July 8, 1976 states that "...limitation (of study of impacts) to 125 mgd is a serious error which significantly underestimates the potential impacts of this proposed action." As such, the present DES is extremely deficient, since it fails to provide a thorough assessment of the impact of the full 500 mgd facility. Neither the primary nor secondary impacts of the 500 mgd facility are adequately identified and evaluated. The status of the water resource "concepts" discussed in the DES is vague and ambiguous, and the assessment of these additional developments fails to discuss the full range of probable effects, especially secondary impacts. The statement that additional federal actions would each be subject to NEPA requirements fails to respond to the contention that federal approval of the Foothills Project would create a commitment to, or prejudice in favor of, further federal actions required for the development of water resources needed to justify the existence of the 500 mgd facility. The evaluation of additional sources of raw water and their environmental impacts cannot be divorced from the Foothills decision, since three fourths of the Foothills Project capacity is useless without additional raw water.

The DES states that:

> The no action alternative would result in the occurrence of peak day shortages about two years sooner than if the project were constructed.

This demonstrates that the basic water problem is one of demand management rather than the lack of treatment and raw water capacity. These demand management techniques should be more fully explored.

Colorado is rapidly approaching full utilization of the water resources available under Interstate compacts and international treaties. In addition, the DES indicates that dams in the DWB system have a useful lifetime of from 50 to 100 years. No plan appears to exist for supplying Denver's water needs beyond the span of a few decades -- a short period in the life cycle of a successful metropolis. Regardless of future additions of water resources facilities to the DWB system, the ultimate limit of the water resources available to Denver must soon be attained. Within a few decades, the total capacity of DWB water storage will begin to decline and will eventually disappear without extensive maintenance and renewal which are not discussed in the DES.

While the discussion of primary impacts on the state highway system is incomplete, it is likely that certain impacts can be minimal. Construction of conduits, disruption of traffic, restoration of highway right of way where disturbed, and system maintenance activities can cause little or no impact depending upon committment to mitigation measures. The DES is deficient in evaluation and committment regarding conduits other than No. 27. It is implicit in the DES that additional distribution facilities will be needed in the future. These must be included with the entire system. Information is also needed regarding transport of construction materials and equipment to the dam and treatment plant sites. It appears that repetitive heavy loads may be required to accomplish delivery. If so route identification and extensive mitigation measures (such as railroad delivery or reconstruction of insufficient state roads) will be required to prevent significant impacts.

Regarding Item 8: Previous Review Comments

It is apparent that the essential questions and objections raised in our review are substantially identical to those presented in the review letters provided through the State Clearinghouse to the Bureau of Land Management on March 1, 1976 in regard to the previous DES. We recommend that the current State review of the Foothills Project DES make specific reference to those comments which remain unresolved. The Final Environmental Statement should contain commitments for implementing all feasible mitigating measures.

The deficiencies of the DES, especially omission of secondary impact analysis make this document highly inadequate for Department of Highways' short and long-range planning needs. By ignoring the obvious growth stimulating effects, the location and type of development as depicted in Maps 1-5 and 1-6 demonstrating increasing urban sprawl, the type of development which the proposal encourages, and finally the construction and operational impacts of the entire water collection, storage and distribution system, the Foothills Project assessment does not allow this Department to determine potential increases in vehicle miles traveled (VMT), the resultant effects of air and noise pollution, or the specific areas where traffic increases or road deterioration may be substantial.

The technical comments of this agency are assembled in Attachment A. Many other questions were raised during our interdisciplinary review which fall within the topics indicated under other agencies in the Work Plan. These auxiliary comments are supplied in Attachment B in case you might wish to use them to supplement the commentary provided by those agencies. Please contact this office if you need further explanation or review. We have appreciated the opportunity to take part in this well organized review process.

Very truly yours,

Jack Kinstlinger

Jack Kinstlinger
Executive Director

Attachment A - Foothills Project

The various technical comments of the Department of Highways are provided below.

Page 1-12. Why is it assumed that the increasingly higher per capita consumption rate will continue. Is it a desirable goal to sustain?

Page 1-14. Re: "In wet years, a surplus of water is stored to help compensate for the lack of water available for collection in dry years." This statement is not demonstrated by existing DWB policy, which emphasizes expansion of storage facilities to support population and economic growth, not to provide a buffer against drought. This statement is crucial to the DES and needs support of detailed historic and projective analysis. The population and water demand projections in the DES are consistent with a growth-promotion, not a drought-amelioration, policy.

Page 1-14 to 1-20. The implication that the Foothills facility is needed to bring treatment and storage capacities into balance is not consistent with the DWB plans described. The latter indicate a "leap-frog" expansion of the DWB system, with persistent excess capacity alternating between treatment and storage facilities.

Page 1-15 and 1-16. The maps showing present DWB service area and the future DWB service area demonstrate that the Foothills Project is contributing to urban sprawl and land use patterns which are not in conformance with the region's land plans. How does BLM reconcile this?

Page 1-17. The quantitative and methodological basis of the projection in Table 1-4 is not provided. The assumptions contained in footnote 1 are controversial, and do not describe a plausible range of alternative futures. The figures used to rationalize the need of the project are based on 1974 rates. The 1977 consumption/use rates are probably significantly lower than previous years and should be reflected in the DES analysis since they represent the effect of conservation.

Page 1-27. Re: "The reservoir . . . would be sufficient to retain sediment for about 75 years." What happens once the facility is rendered useless? How does this affect the cost-effectiveness of the proposed project? What are the ESE effects of an abandoned reservoir?

Page 1-52. Isn't there already a waste disposal problem from the MDSDD #1 plant? How will disposal from the Foothills Plant be managed to avoid repeating the problem?

Page 2-5. Discussion of existing utilities does not include consideration of other metro water suppliers such as Aurora. All metropolitan water suppliers and their potential for serving future population up to the DRCDG projection of 2.35 million (year 2000 policy forecast) should have been assessed in the DES.

Page 2-6. Table 2-3 indicates irrigation, toilet flushing, and bathing account for 84.3% of all domestic water use in the DWB service area. Modest conservation efforts could easily reduce water use for each of these purposes by 1/2, with little or no negative impact on lifestyles. This would represent a 42% increase in available per capita treated water for domestic use without construction of the proposed Foothills project, other things being the same. These data clearly demonstrate that modest conservation efforts could be significantly cost-effective in meeting the needs of Denver water consumers. Therefore the DES should have treated conservation as a viable alternative and as a viable component of other proposed alternatives.

Page 2-14. Much is said about need for water to irrigate lawns and gardens. Why use treated water for this? One alternative considered might have been separate distribution system for watering and other non-potable needs. The discussion of time and money invested in horticulture has no empirical basis. Inclusion of public parks, highway ROW, golf courses, and commons areas of multiple dwellings, completely distorts the estimate of individual investment in horticulture. It should be noted that many if not most of the latter are irrigated with well water and do not represent a demand on DWB facilities.

Page 2-29. Ground Water - There is no discussion of the water available from the bedrock acquifers of the Denver Basin. All sources of water should be inventoried.

On page 2-65 it is stated that: "Cars traveling over dirt roads produce dust . . . (which) is the most prevalent source (of air pollution) . . . within the Foothills area . . ." This is contradicted by the following statement on page 2-66: " . . . air in the project area exceeds only the standard for particulates. This is probably the result of fugitive dust rather than man-caused development."

To our knowledge, cars traveling on roads is a "man-caused development."

Page 2-90. Paragraph 3 "Douglas county zoning regulations support the comprehensive plan". This is totally wrong. Douglas County's comprehensive plan was declared null and void in February, 1975! Adequacy of Douglas County's regulations relating to new communities is currently being questioned.

The Land Use Commission formally requested Douglas County to designate new communities as matters of state interest. Douglas County Commissioners held the required public hearing and has issued an order to the Land Use Commission that such regulations are not needed. The Land Use Commission now has to make a decision on whether to let the matter pass or whether to take Douglas County to court.

Page 2-91 to 2-93. The section "Future Environment without the Proposed Action" is actually the "do nothing alternative". The format of the DES obscures direct comparisons of alternatives. The meaning of assumption #1, that the total amount of raw water available to the DWB will remain constant, is unclear. Since, as the DES notes elsewhere, the capacity of water storage reservoirs is continually and progressively diminished by siltation, the implication of this statement is that additional water storage facilities will come on line at a rate that balances the gradual deterioration in capacity. If so, these additional facilities are not identified. If existing storage reservoirs are to be dredged to maintain constant capacity, the costs and impacts of this activity are not described.

The future scenario is invalidated by the singular use of the assumptions #2 and #3, as follow:

2. Human population in the DWB service area will continue to grow as estimated by the Denver Regional Council fo Governments (DRCOG) . . .

3. As long as raw water is available the current trends in water use patterns will continue . . . Such trends will be reflected in both the average per capita per day consumption and in the maximum-day per capita consumption".

Page 2-107. Re: Last paragraph. The argument presented is simplistic: is unsupported by empirical analysis; and fails to identify alternative future conditions which would produce different patterns of urban growth and development.

Page 2-108. Will water be available to Douglas County, especially the Parker area and the Highlands Ranch? The DWB has previously indicated it would serve any land in northern Douglas County below 6200 feet in altitude.

Page 3-1. The statement that "Secondary impacts are identified and traced as far as practical" is totally untrue.

Re: Assumption #3. NEPA and BLM guidelines require identification of the relation between short-term uses and long-range productivity of the human environment. The impact of the project facilities on the human environment beyond their useful lifetime also needs to be identified and evaluated.

Re: Assumption #4. "Current water use trends" described in the DES do not account for cycical variations in climate affecting water supply and use. Again, the assumption of population growth being exogenous from water resource development is incorrect; water is obviously a constraint to growth.

Page 3-5. The use of the assumptions (page 3-1 to 3-5) to justify the conclusion that "the Foothills Project would not alter future population trends in the Denver metropolitan area. . ." is teleological and insupportable without a valid analysis of alternative assumptions in the DES. This source erroneous conclusion is repeated throughout the document, eg. pages 3-11 and 3-12.

Page 3-8. Re: third paragraph. This paragraph is unrelated to the section. It represents the lack of significant assessment of secondary impacts. The section on income also does not include the additional income of the DWB and its employees resulting from increased water sales.

Table 3-2, for reasons discussed above, does not represent a meaningful assessment of alternative future water requirements in the DWB service area.

Page 3-12. The discussion of community lifestyles is extremely inadequate. An alternative interpretation would be that the impact of expanding the proposed facility would be to delay essential adjustments in social behavior required to adapt to the reality of finite water resources.

The contention that increased water supply would have no impact on wastewater treatment plants is unjustified. More treated water has direct correlation with water that ends up in sewage plants.

Page 3-17. Re: paragraph 3. Stating that the impacts of 500 mgd development are difficult to assess does not satisfy the requirements of NEPA.

Re: paragraph 4: It should be made clear that the utility of this project depends on the Two Forks Dam project (or equivalent) and proposed facilities on the Blue and Eagle River watersheds.

Page 3-8. Re: paragraph 1. Properly divided, the annual cost would be $26,462,300 not $2,646,230. The entire State budget is presently less than $2 billion annually. The DES discussion very much obscures the costs to DWB customers.

Page 3-35. The DES contains a false statement that the: "Use of construction vehicles would result in emissions. However, the Clean Air Act of 1970 requires emission control devices on all new vehicles, including construction vehicles." (p. 3-35). Emission control devices are currently required only on "light-duty" vehicles and engines, which do not include most construction vehicles (42 U.S.C. 1857f-1). Emission reduction devices will not be required on construction vehicles until model year 1979 (Section 224, Clean Air Act Amendments of 1977).

It is unlikely that more than a small percentage of construction vehicles used in building the initial project would be brand new (1979 models or later).

Page 3-36. The section on Climate does not address cyclical and long-term climate change.

Page 3-61. "The impact (on roads) of construction for the second conduit would be greater, but this is not quantifiable". - If impacts are quantifiable for other conduits why not this one?

Page 3-61. The DES states that severe traffic restrictions will occur on South Colorado Boulevard and South Holly Street, during the construction of the first and second conduits (p. 3-61). This impact can and must be mitigated.

Page 6-1. Re: paragraph 1. Far more detailed and extensive discussion is required of the consequences of the project beyond the 75-year expected lifetime. What long-term environmental effects will result from the dam and treatment plant facilities? How will the water needs of future Denver residents be met after these facilities become inoperative? Is Denver's population expected to decline after the existing water supply system becomes useless?

Chapter 6 of the DES fails to address the socio-economic impact of further water diversions from the western slope and is therefore inadequate.

Page 7-2. Chapter 7 does not assess secondary impacts.

Page 8-1. Consideration of No-Build is inadequate. Does not explore possible changes in land use patterns to denser settlement patterns leaving majority of irrigated lawns to recreation areas. Increased density would aid feasibility of a viable mass transit system which would reduce overall VMT which would ultimately reduce air pollution.

No Build needs closer evaluation of water use rates as of this summer and the tap allocation program.

Page 8-6. Contains the significant statement that:

> The no action alternative would result in occurrence of peak day shortages about two years sooner than if the project were constructed. However, by 1990 and beyond, consumers in the DWB service area would experience an equal number of water shortage days with or without the project.

If the reader searches very carefully through the document, these statements appear to be verified. For example, the last paragraph on page 1-18 would support this conclusion. (However, the erroneous reference to Tables 2-27 and 2-28 on page 8-15 make the task even more cumbersome.) One does not find this critical information in the section FUTURE ENVIRONMENT WITHOUT THE PROPOSED ACTION (pages 2-91 to 2-108) where it should have been cited originally. If the Foothills project is only a means of delaying the reality of Colorado's lack of water resources for a period of two years, it would seem that the benefit/cost relationship alone would make the project unacceptable.

It also appears that the claim that Foothills will allow the existing life styles to be maintained until 2001 is a misrepresentation. In addition to the inconsistency of the above statement with this claim, the construction schedule seems at odds with the needs. Between 1988 and 1990, the total reliable annual water supply (312,300 ac-ft) will be utilized regardless of the Foothills project. Yet, the 500 MGD expansion facility will be constructed between 1986 and 1998 based on the assumption that additional raw water will be obtained via one of three water supply alternatives. No comment is made as to when the facility will be operable, 1998? If so, then shortages will be realized in the interim.

Many questions arise when one attempts to interpret the data presented. Table 2-30 suggests a shortage as early as 1980 without the project while raw water does not become a limiting factor until 1990 (Table 8-1). The early shortage is attributed to lack of treatment facilities. (It seems an assumption is made that alternatives exist for treatment otherwise lack of raw water would never become an issue.) The statement is then made that water demand will increase until it equals the reliable available raw water supply, 312,300 acre-feet (pages 2-95 and 8-15). This brings to mind the following questions:

a. Why will demand continue to increase in spite of shortages due to lack of treatment facilities?

b. Or what happens to demand when it equals the raw water supply? Does demand no longer increase when it equals supply?

c. If in fact demand does not increase after it equals the raw water supply then what is the need for the 500 MGD facility?

It would appear that the analysis done on this project is very weak. The belief that the project has no relation to population growth is not supported by the above discussion, unless of course, increase in demand has no relationship to population.

Page 8-11. Re: fire fighting. No reason is given in the DES why treated, potable water is required for fire fighting.

Page 8-12. The discussion of water rationing is completely unrealistic and inappropriate. The costs, benefits, and effects of water conservation programs are not objectively assessed.

Page 8-13. The discussion of water metering and alternative rate structures is simplistic, unrealistic and not based on empirical evidence. The assumption that business establishments would be exempt from escalating water rates is completely unjustified, and arbitrary. The last sentence on the page is a gross understatement. The data presented in the DES indicate the installation of domestic water saving devices and other modest conservation measures could reduce domestic water consumption by 40% or more without dramatic effect on community lifestyles.

Page 8-14. The identification of local storage as an alternative to the construction of large-scale water supply facilities is good, and should be evaluated far more extensively.

The statement regarding System Improvements is grossly inadequate. Commitment to major construction at Foothills would be highly inappropriate in the absence of a thorough study and evaluation of the efficiency of the existing DWB water distribution system.

The discussion of recycling is far too brief. Given the long expected lifetime of the proposed project, short-term constraints on water recycling should not be an obstacle to thoroughly assessing the long-range benefits of recycling in comparison to the prodigious costs of the proposed project. The study of recycling should also include consideration of the use of "gray water" for irrigation and other end uses not requiring water of potable quality.

Page 8-20. Under the discussion of Conduit 27, since it is not presented elsewhere, the disruption caused by conduit construction should be included. Is there adequate highway right of way for multiple use or will the conduit enter Chapel Hill Cemetery property? Also, Orchard Avenue and Happy Canyon Road should be included in Table 2-29.

Page 8-29. The identification of new sources of raw water in the discussion of "Alternatives to the Proposed Action" is inappropriate. The DES indicates new sources of water are not an alternative to the proposed project, but are essential to the implementation of the 500 mgd development. The format of the presentation here tends to confuse and obscure public perception of the critical issues posed by the Foothills proposal.

Page 8-31. Analyses of other alternatives especially the water supply concepts (i.e. Two Forks Reservoir) does not address probability of contrived low density sprawl which has direct implications for financial liability of State and locals to provide and maintain the necessary road facilities. Low density sprawl also has direct implications of a resultant increase in air pollution levels.

STATE DEPARTMENT OF HIGHWAYS
JACK KINSTLINGER EXECUTIVE DIRECTOR

DIVISION OF HIGHWAYS
E. N. HAASE
CHIEF ENGINEER

COLORADO STATE PATROL
COL. C. WAYNE KEITH,
CHIEF

4201 EAST ARKANSAS AVENUE • DENVER, COLORADO 80222 • (303) 757-9011

September 19, 1977

Mr. Philip H. Schmuck
Director
Colorado Division of Planning
520 Centennial Building
1313 Sherman Street
Denver, CO 80203

Dear Mr. Schmuck:

I would like to supplement the Department of Highways' comments of September 12, 1977 on the Foothills DES as follows.

The Foothill's DES uses the Denver Regional Council of Governments' future population estimates as ". . . the basis for the DWB's [Denver Water Board's] planned water system development." (p. 1-12). Thus a year 2000 population of 2.35 million people in the metropolitan area is used in an attempt to justify the proposed Foothills project. However, the implications of this population growth have never been systematically assessed. At the same time the unrestricted availability of cheap water has been used to generate the population projections.

The Colorado Department of Highways has conducted studies of the consequences of such growth which reveal that a regional population of 2.35 million for the year 2000 may well be intolerable. As part of the Colorado Department of Highways' study concerning I 470 an analysis was made of region-wide traffic projections for the year 2000.

For the anlaysis the following assumptions were made:

- A year 2000 regional population of 2.35 million as projected by the Denver Regional Council of Governments (DRCOG);
- A regional highway network costing five times all projected federal, state and local revenues; and
- The implementation of the Regional Transportation District's (RTD) multi-billion dollar light rail and bus system.

This analysis concluded that, based on these assumptions, the following conditions would occur in the year 2000:

---

1. The complete breakdown of the region's highway system (see Figure 1, attached), and
2. Air pollution concentrations seriously exceeding the federal standards designed to protect human health (see Figure 2, attached).

In addition, the study demonstrated that the cost of providing public services to new growth on the urban fringe exceeds the revenues such new growth generates by 180%.

Based on this analysis the I 470 Ad Hoc Commission, composed of Hal Anderson, Jefferson County Commission; Robert L. Tonsing, the 470 Task Force; Dennis M. Orr, Board of Directors, Denver Chamber of Commerce; Edward T. Lyons, Attorney; H. Lee Ambrose, Highway Commissioner; Paul W. Thompson, Lakewood City Councilman; Maggi Markey, Boulder County Commissioner; Sally Parsons, Littleton City Councilperson; Mike Moore, Co-Chairman FACTS (For Alternative Community Transportation Systems); Monte Pascoe, Attorney; Joanne Paterson, Jefferson County Commissioner, Co-Chairperson; Harold Patton, Mayor, Greenwood Village, Co-Chairperson, concluded on December 17, 1976 that:

> The above problems are directly related to the DRCOG/JRPP land use plan and population projections which form the data base for highway traffic analysis. The Ad Hoc Commission urges that development of alternative land use plans, population projections, and transportation plans be initiated immediately to address the above concerns and that the social, economic, environmental effects and public cost implications of any alternatives be analyzed prior to acceptance.

Very truly yours,

Jack Kinstlinger
Executive Director

DENVER METROPOLITAN AREA CONSISTANCY STUDY
STUDY DAY OZONE DISTRIBUTION
MAXIMUM 1-HOUR O_3 CONCENTRATION IN PARTS PER MILLION
2000 JRPP PLAN

THE ENTIRE SHADED AREA IS PROJECTED TO EXCEED
THE FEDERAL AIR QUALITY STANDARD DESIGNED TO
PROTECT HUMAN HEALTH

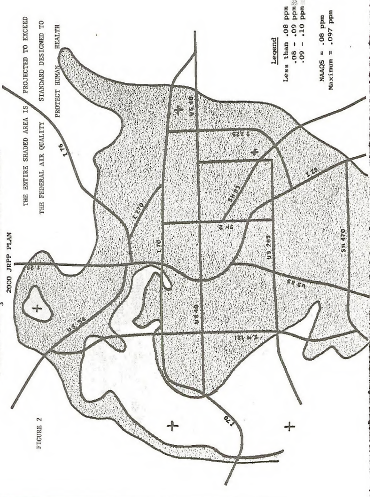


FIGURE 2

COLORADO WATER CONSERVATION BOARD
823 State Centennial Building
1313 Sherman Street
Denver, Colorado 80203

MEMORANDUM

TO: Chips Berry
Water Study Coordinator

FROM: Laren D. Morrill
Deputy Director

DATE: September 12, 1977

SUBJECT: Draft Environmental Statement on the Proposed Foothills Project

Members of the staff of the Colorado Water Conservation Board have reviewed the Draft Environmental Statement on the proposed Foothills Project and consider it to be adequate. Given the assumed population projections, even without any increase in per capita use, it is evident that the demand for water will exceed the present treatment capacity of the Denver water system in the near future. Conservation methods such as sprinkling regulations, mandatory water-saving devices in the house, universal metering, and rate increases or adjustments could put off the day of reckoning for a short tie; but within a few years, the demand for water would outstrip the treatment capacity. Therefore, prudent planning dictates that additional capacity be constructed as soon as possible.

Of all the alternatives that have been proposed, either in the Draft Environmental Statement or informally, in our opinion the proposed Foothills Project is the most viable. While the dam, tunnel, and access road must be constructed for the ultimate 500 mgd capacity, the treatment plant itself is planned in 125 mgd increments so that it can be enlarged as future demand dectates. Because this plant would supply the area by gravity flow instead of pumping, it would operate as a base load plant at an estimated average of 85 to 90 percent of capacity. The present plants, most of which must pump a considerable portion of their treated water, would then operate primarily as peaking plants. Under this plan, there would be a considerable savings in electrical energy and fuel requirements.

We think that the only two viable alternatives to the proposed plan are a lower dam or an upstream diversion dam. The lower dam would have about the same environmental effects as the proposed dam and would result in higher treatment costs because of less settlement capacity. The upstream diversion dam would be subject to icing problems; therefore, the plant probably could only operate during a nine-month period. This would result in increased energy demands for pumping during the winter months. Also, treatment costs would be higher because of lack of settlement capacity upstream from the diversion dam.

The Chatfield alternative has so many problems that we do not consider it to be viable. The alternative of storing additional treated water to meet the increasing demands would be extremely expensive if enough storage were provided to be effective. Even if this were feasible from the economic and environmental standpoint, it would only put off the requirement for additional treatment plant capacity until the total yearly demand for treated water exceeded the annualplant capacity. In addition, the tremendous energy requirements for pumping would continue.

Our only other comment is that the proposed Foothills Project is an independent unit, and its immediate need is not dependent on a future Two Forks dam and reservoir as some have claimed. While it is true that prudent engineering practice would dictate that the Foothills Project be designed so that it would become an integral part of a future Two Forks Project, it is our opinion that speculation concerning the relationship between a present Foothills Project and a future Two Forks Project is not and should not become an issue at this time.

LDM:tam

COLORADO DEPARTMENT OF HEALTH
4210 EAST 11TH AVENUE · DENVER, COLORADO 80220 · PHONE 388-6111
Anthony Robbins, M.D., M.P.A. Executive Director

September 16, 1977

Harris Sherman
Executive Director
Department of Natural Resources
1313 Sherman
Denver, CO 80203

ATTN: Chips Berry

RE: Foothills Project, DEIS

Dear Harris:

The Department of Health has reviewed the DEIS for the proposed Foothills Treatment Plant. The substance of our comments fall into categories - the one being issues primarily concerned with indirect impacts which may be stimulated by the construction of Foothills, and the other being those technical aspects of the DEIS itself which the Department of Health feels have been inadequately addressed from a divisional point of view.

In essence, the Department feels that the alternatives outlined in the Draft cover only some of the possible courses of action available and that greater breadth and depth of these alternatives should have been developed and analyzed in order for the document to offer a true source of factual comparisons.

In the discussion of individual treatment capacities of the three Denver plants, we note that although Moffat has a designed capacity of 210 MGD it has normally been operating well under this capacity. Apparently, sufficient quantities of raw water are not available to supply the plant on a continuous basis through the Moffat system. If this is as stated, the Department would then raise the question of the possibility of transporting raw water from the South Platte Roberts Tunnel to the Moffat Plant to more fully utilize the existing treatment capacity. In addition, it is difficult to address the need for additional treatment facilities without having the data available to analyze the extent of plant operation at or near full capacity. If treatment capacity is approached or exceeded for only limited periods of the day, the short-term solution may be increasing the treated water storage capacity of the system rather than in developing additional treatment capabilities. This in turn leads one to ask what will the entire system

look like by the year 2000. Will the Marston and Moffat plants be in use on a daily basis once the 500 MGD at Foothills is on line? And if not, why will Foothills be expanded to 500 MGD at the expense of allowing Marston and Moffat to lie idle? This doesn't appear to be good economics in this context.

And, while on the subject of benefit/cost, we in the health delivery field have witnessed a tremendous increase in service requirements in the last few years without a commensurate trend in funding for these requests. It appears that the DEIS with its apparent lack of concern for these indirect health-related issues has failed, at least in part, by not taking grasp of the peripheral influences which the increased availability of water will have on the other governmental service needs normally associated with the growth trend as outlined in the document. It seems to us that a projection about growth and its desired life style should also address how that growth projection might be affected should the project not be built. What figures are available as to per capita cost should a (possible) condition exist in which Foothills is built and current population projections aren't reached and projected daily use is reduced - through conservation methods? It appears that the high capital costs of Foothills will have to be shared by a smaller than anticipated population base with the result that Denver water users will be saddled with exorbitant water rates. If this were to occur, it would appear that because of conservation methods more expensive water would be the reward. We feel some mention of this possibility should at least in passing be open for public review.

The following issues deal with more specificity around technical issues as outlined by my staff:

Water Quality & Engineering Division:

1. The brief discussion on the impact upon wastewater treatment facilities (p. 3-12) is inadequate. Apparently, the DEIS takes the position that growth in the Denver Metro area is inevitable, and this project simply will keep up with growth and not induce it.

   If the position is taken opposite of this, namely that water supply will generate growth, and consequently, sewage treatment needs, a considerable impact on area sewage facilities is apparent. Assuming the historical ratio between potable water produced and wastewater treated holds in the future, a wastewater treatment capacity of 193 MGD will be necessary with the 125 MGD phase, and 300 MGD wastewater treatment capacity will be needed at the 500 MGD phase. This latter figure is far in excess of the existing or planned capacity of area wastewater plants, and will require a large capital expenditure within the time frame of the DEIS.

2. The DEIS estimates the salinity increase at Imperial Dam resulting from the 500 MGD phase of this project at 7 mg/l (page S-2), and also discusses a number of direct impacts on west slope fisheries resulting from additional diversions (Chapter 8). It does not go into detail on the secondary effects of these additional diversions, however.

   The Northwest Colorado COG, through their 208 water quality planning program, has examined these possible impacts in more detail including:

   A. Additional wastewater treatment costs due to less dilution water available.

   B. Loss of aquatic habitat (beyond that discussed in the DEIS) due to reduction in "spring flush".

   C. Economic loss to the west slope due to reduced recreational activities such as fishing and kayaking.

   D. Economic detriment to junior water rights holders.

   The Northwest Colorado COG goes on to suggest a system of offsetting these losses to the west slope through a repayment scheme among other measures. The final Environmental Statement should address these west slope water quality concerns and recommendations in more detail.

3. The DEIS devoted very little time and effort to the possibility of treatment and reuse of wastewater flows from the Denver region (p. 8-14, 15). Its primary justification for dismissing this question is the lack of existing systems in the U.S. today for producing drinking water from wastewater. Since the primary impetus for the Foothills Project is to meet the high summer use requirements (lawn irrigation), it only stands to reason that if wastewater effluent could be treated to meet lower standards for lawn irrigation, the Foothills Project may not be necessary for some time into the future. This option should be addressed more fully in the final EIS.

4. The obvious short term construction related impacts on the South Platte River system have been adequately addressed in our opinion.

5. In reviewing the DEIS, erosion and sedimentation are the major water quality concerns. Construction activity of the type associated with this project increases the potential for erosion on a large scale, and, although of a temporary nature, will increase the quantity of sediment entering local water bodies.

   Because of the limited construction detail available in this report, it is extremely difficult to assess, with any reasonable accuracy, the magnitude and extent of water pollutant discharges from the construction areas. Estimates contained in the DEIS indicate that the average amount of sediment transported by water from its source area into local watercourses can be expected to approximate 1/2 ton/acre/year at the 125 MGD stage and 3 tons/acre/year at the 500 MGD stage.

   Great care should be exercised to control runoff from construction activities so as not to exert harmful effects on local water bodies. The proper application of drainage control measures during construction can alleviate the more serious runoff problems. The report does indicate that techniques will be employed to minimize erosion (landscaping, etc.).

6. Relocation of the South Platte channel during construction of the dam and reservoir and crossing of the South Platte will require a Section "404" permit from the U.S. Army Corps of Engineers and certification through the Colorado Health Department. NPDES permits will be required for all pollutant discharges into the waterway.

   There appears to be a discrepancy between statements which predict the effective demand capacity of the 125 MGD addition. Page 1-18 indicates that demands "could be met until around 1983". Page 3-8 states that "additional treatment capacity and more raw water would be required beginning in 1988".

7. The discussion of toxic chemical spills is inadequate for our purposes. We request that additional attention be directed to the preparation of a plan for the control of serious vehicular collisions or major accidents that would result in a toxic chemical spill (chlorine, ammonia, etc.).

Radiation and Hazardous Wastes Control Division:

On page 3-39, it is noted that noise levels next to the Strontia Springs Dam would range from 85 to 95 dBA and a noise level of 60 dBA would be anticipated 4000 feet downstream. Referring to Map 1-2, the 55 dBA contour (7200 feet) would reach as far as the mouth of Mill Gulch. The 50 dBA contour (13,000 feet) theoretically would extend north almost to the South Platte intake and east through the middle of Roxborough Park. (Colorado State noise standards for residential areas are 55 dBA during daylight and 50 dBA at night.)

Since the ambient levels in the region are low (32 to 40 dBA), an isolated noise source such as the dam's regulating valves will be more disturbing than it would be in a region of higher ambient noise. Theoretically, the noise is attenuated to the ambient level of 40 dBA at 41,000 feet.

Air Pollution Control Division:

(Primary) Air Quality Impacts

The construction and operation, in itself, of the proposed water diversion and treatment facilities or their alternatives should have minimal impact on regional air quality. Mitigating measures are available to reduce the air contaminants released during both on-site construction and operation of the facilities. The pollutant of primary concern is particulate.

Securing the necessary air pollution emission permits is a Department of Health authorizing action which should be (and was not) included in Table 1-3 "Summary of Authorizing Actions". Since the project lies in a Commission designated air pollution control area, all fugitive dust permit provisions apply. The following activities can be identified in the DEIS which would require emission permits:

1. Strontia Springs Dam: Excavation for access area, reservoir, and dam fill; fugitive dust emission (Regulation No. 3; Regulation No. 1, Section II.D.).

2. Stevens Gulch: Concrete batching operations; point source emission permit (Regulation No. 3).

3. Stevens Gulch: Four acre staging area; fugitive dust emission permit (Regulation No. 3; Regulation No. 1, Section II.D.).

4. Chatfield area: Gravel mining, crushing, screening (if not an existing permitted or grandfathered source); point source and fugitive dust emission permit (Regulation No. 3; Regulation No. 1, Section II.D.).

5. Platte Canyon Road: 13,900 feet of road, 3000 feet new; gravel with Pentaprime application; 20 trucks per day plus construction workers; fugitive dust emission permit (Regulation No. 3; Regulation No. 1, Section II.D.).

6. Tunnel Excavation: 102,000 yd^3 to be excavated and deposited on prescribed areas along Little Willow Creek, 30 level acres at East Portal of Tunnel; fugitive dust emission permit (Regulation No. 3; Regulation No. 1, Section II.D.).

7. Foothills Treatment Plant: Six acres to be disturbed, 2,699 foot road from south to use crushed rock; fugitive dust emission permit (Regulation No. 3, Regulation No. 1, Section II.D.): activated carbon storage and handling system; point source emission permit (Regulation No. 3).

8. Conduit #27: 115 acres total land disturbance: unsurfaced bladed road constructed parallel to conduit #27, fugitive dust emission permit (Regulation No. 3; Regulation No. 1, Section II.D.).

9. Existing Douglas County gravel roads #5; #7 used to access south from Kassler; increase in traffic may require dust control plan pursuant to Regulation No. 1, Section II.D.

If the controlled emissions from a single or cumulative sources will exceed 25 tons per year, a period of public comment is required (Air Pollution Control Regulation No. 3, Section G.). Compliance with the applicable performance and ambient air quality standards must be demonstrated in order to secure a permit. The following time could elapse from the date of submittal of a complete application:

20 days permit review
10 days preparation and publishing preliminary analysis
30 days to receive public comment
30 days to evaluate response to public comment
5 days issuance or denial of permit

TOTAL 95 days

A detailed analysis of the uncontrolled and controlled emissions is a necessary part of any permit application. We would therefore not require such an analysis as part of this EIS. However, a cursory analysis would allow more meaningful information to be provided relative to the primary air quality impacts. It could also affect and therefore assist the BLM and Denver Water Board in preparing the hypothetical construction schedule (pp. 1-24). An Air Pollution Division internal worksheet is attached which may be used for this purpose. The Division should be contacted for information on control efficiencies and emission factors.

The Department of Health submits this review and offers these comments in the spirit of cooperation in hopes that BLM's final decision will prove beneficial for all of Colorado's citizens in both the near and long term future of our State.

Sincerely,

Ron Simsick
for Anthony Robbins, M.D., M.P.A.
Executive Director

AR/ggb

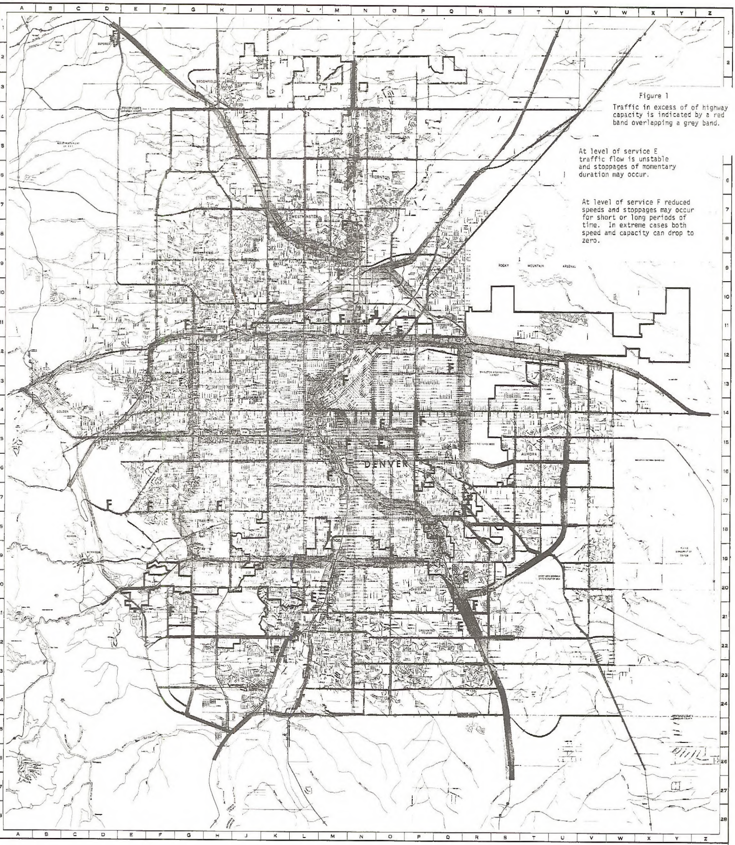


Figure 1

Traffic in excess of of highway capacity is indicated by a red band overlapping a grey band.

At level of service E traffic flow is unstable and stoppages of momentary duration may occur.

At level of service F reduced speeds and stoppages may occur for short or long periods of time. In extreme cases both speed and capacity can drop to zero.

2000 AVERAGE ANNUAL WEEKDAY TRAFFIC
(JRPP PLAN)

DENVER
AND
SURROUNDING AREA

2000 AVERAGE ANNUAL WEEKDAY CAPACITY
(JRPP PLAN)

LETTER INDICATES LEVEL OF SERVICE

SCALE OF MILES

STATE HIGHWAYS
ROADS AND STREETS
COUNTY LINES
BOUNDARY LINES
CITY AND COUNTY OF DENVER BOUNDARY
OTHER INCORPORATED CITY AND TOWN BOUNDARIES

HIGHWAY ROUTE MARKERS
INTERSTATE AND STATE
U.S. AND STATE
STATE

PREPARED BY
STATE DEPARTMENT OF HIGHWAYS
DIVISION OF HIGHWAYS - STATE OF COLORADO
PLANNING AND RESEARCH DIVISION
IN COOPERATION WITH
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

Department of Local Affairs
Colorado Division of Planning
Philip H. Schmuck, Director

1876
Richard D. Lamm, Governor

September 8, 1977

Mr. Harris Sherman
Executive Director
Department of Natural Resources
1313 Sherman Street
Denver, Colorado 80203

SUBJECT: Draft Environmental Impact Statement
Proposed Foothills Project

Dear Mr. Sherman:

The Colorado Division of Planning has received and reviewed the draft environmental impact statement for the Proposed Foothills Project and submits the following comments:

Policy Comments

We feel that the current environmental impact statement is inadequate on several grounds. While impacts on the physical environment in the area of the proposed treatment plant and storage reservoir were thoroughly covered, assessment of economic and social impacts were woefully inadequate and, in some cases, reflected gross misunderstandings of the potential effects of the decision to be made. The selection of alternatives ignored such obvious choices as additional treated water storage capacity and a combination of the Phase I Foothill treatment plant with the conservation program. Inadequate economic information was included to allow any intelligent discussion of trade-offs between adverse environmental impacts and higher costs of water delivery.

Many of these deficiencies in the environmental impact statement are inherent in rules for EIS preparation adopted by the Department of Interior. These statements frequently leave the impression that the decision on the project has already been made and the statement is merely a justification for that decision. As Mr. Robert Flynn, attorney for several suburban water and sanitation districts, stated in a debate on September 7, "I suggest to you that this is not a matter of debate. Foothills will be built." (Rocky Mountain News, September 8, 1977.)

Despite the inadequacies of the environmental impact statement, we believe that it does justify the need for additional treatment capacity in the Denver area, although not as urgently as has been suggested. Construction of the treatment plant at a capacity of 125 mgd, provided that it does not discourage the analysis of other water supply alternatives, appears justifiable in terms of the economic

520 State Centennial Building, 1313 Sherman Street, Denver, Colorado 80203 (303) 892-2351

---

impacts. However, expansion of the plant to the capacity of 500 mgd, particularly if such an expansion includes the construction of the Two Forks Dam, appears extremely grave in terms of physical and social consequences, and the environmental impact statement does not provide justification for proceeding with the Phase II expansion over other alternatives suggested.

The environmental impact statement does suggest enough adverse impacts from any of the alternatives, including the proposed Foothills treatment plant, to warrant a conclusion that water conservation is essential in future planning for the Denver Metropolitan Area. The environmental impact statement, however, appears to ignore this clear direction, and proceeds to treat conservation as if it were a form of punishment for failing to accept the directives of the Denver Water Board. Instead, the environmental impact statement favors the preservation of existing life styles which, in view of the negative side effects accompanying such life styles (e.g.: deteriorating air quality, excessive energy consumption, traffic hazards and congestion, disruption of natural ecosystems, etc.), one might question the value of preserving. The Governor's Growth and Development Statement sets as a state policy "to promote an ethic of stewardship and conservation of our natural resources and our environment", and, with respect to Foothills, we recommend that the State take a clear position in favor of conservation as a part of any alternative finally selected.

Evaluation of the Impact Analysis

As the agency responsible for demographic projections for the State of Colorado, we find that the population projections used in the environmental impact statement and originally promulgated by the Denver Regional Council of Governments are within an acceptable range of reasonable forecast. One minor error occurs on Page 2-1 in that the 1970 population for the six counties was 1,238,250, not 1,235,936.

On Page 2-90, the statement references zoning regulations which rely upon a county-wide comprehensive land use plan in Douglas County. It is true that the Douglas County Planning Commission adopted a land use plan on April 23, 1974. However, the land use plan with accompanying maps was declared null and void by the Douglas County Commissioners on February 11, 1975. The failure to notice this repeal constitutes a significant omission in that it removes one of the prime assumptions that forms the basis for the land use forecasts displayed in maps 2-15 and 2-16.

Assumption No. 3 on Page 2-93 seems wholly unwarranted. In any case, this should be a matter for analysis in the environmental impact statement rather than an unfounded assumption.

A similar statement could be made concerning the proposition on Page 3-5 that "the Foothills Project would not alter future population trends in the Denver Metropolitan Area". Again, such an assertion should be analyzed by the environmental impact statement rather than making an assumption without foundation. If the assumption is founded on the belief that if Foothills is denied, other sources of water can readily be obtained to replace it (a proposition which the BLM team leader denied at our recent briefing), such alternate water sources should be analyzed as potential

---

alternatives to the Foothills Project. Some of those alternatives (e.g., condemnation of east slope agricultural rights) might be unacceptable because of their impacts while others (e.g., utilization of deep aquifers) might provide productive analysis. However, it might also disclose that the alternative sources of water are more costly than some of the alternatives rejected by the Denver Water Board because of cost. Furthermore, it would appear that the Denver Water Board's policy of restricting suburban taps this summer has caused some reduction in the number of new units built. If such a trend continued over a period of time, it is conceivable that new businesses would be discouraged from locating in the Denver Metropolitan Area and that growth could in fact be impacted by the decision. We agree that water availability is not the sole determinant affecting growth, but we feel that there is adequate documentation that water availability is a critical factor in population expansion (see The Growth Shapers, Urban Systems Research and Engineering, Inc., Washington, May 1976, p. 20; Guidelines for Preparation for Environmental Impact Statements, Council on Environmental Quality, Section 1500.8(3)(ii), Federal Register, Volume 38, No. 147, August 1, 1973). Therefore the only question remaining is whether or not there is relationship between the proposed Foothills Project and water availability in the Denver Metro Area. Since it is the position of the Denver Water Board that without Foothills, Denver will be denied needed water, we feel that the relationship between Foothills and growth needs much more discussion than it has received in the environmental impact statement.

Another question which the environmental impact statement fails to address is the relationship of the Foothills Project to future patterns of growth. In the Growth and Human Settlement Study currently being prepared by the Division of Planning, we find a significant relationship between the pattern of development and public facility costs, environmental considerations, and socio-economic concerns. As patterns spread and densities decline, each of the above stated items is negatively affected. It is safe to assume that the Foothills Project won't discourage low density or "sprawl" conditions. To the contrary, we feel that it would encourage continuation of sprawl in the Denver Metropolitan Area. For example, it should be noted that by assuming gradually increasing levels of per capita water consumption, the authors of the environmental impact statement have assumed a continuing pattern of sprawl development. This is confirmed by the projections for land use in the newly developing areas that are shown in maps 2-15 through 2-17 of the EIS. Further, most of the projected population increase for the Denver Water Board service area will occur in the suburban counties. In the past, suburban densities have been lower than those found in the City and County of Denver. With these facts in mind, it would seem appropriate for the environmental statement to analyze the lawn irrigation demands of alternative development patterns. Perhaps they could use various patterns in densities that exist in the Denver Water Board service area as the models for obtaining this information.

If there is any doubt that water availability affects patterns of development, it is certainly clear that the converse is true. Patterns of development affect water consumption. A joint HUD/EPA/CEQ report (The Costs of Sprawl: a Detailed Cost Analysis, Real Estate Research Corporation, Washington, April 1974, p. 21)

---

states that water consumption can be as much as thirty-five percent higher in low density sprawl communities than in higher density planned communities. The reason for the difference is attributed to lawn irrigation which increases as lot sizes become larger. The environmental impact statement adds that residential lawn irrigation in the Denver Water Board service area accounts for nearly forty percent of the annual water consumption for a family of four (page 2-6). Since lawn watering generally takes place between May 1 and September 30, it can account for thirty-one percent of all water used for that period. While we agree with Denver Water Board claims that it is not and should not be responsible for making decisions based on its own philosophies of growth control, we strongly feel that, as a resource supplier, it should be extremely concerned about water conservation. Therefore, the Denver Water Board should be very concerned about how its water policies might contribute to sprawl in view of the established high levels of water consumption related to that pattern of development.

The third paragraph on page 3-8 appears to be the only attempt made to assess the social impacts of the proposed project other than an assessment of potential accidents and recreation affected. This is by far the weakest section of the environmental impact statement. The author appears to assume that negative social impacts will only occur to persons who are opposed to the project, even though there is no suggestion as to what the negative social impacts might be. The statement not only fails to quantify the negative social impacts (an admittedly difficult proposition), but it even fails to classify the impacts. It then continues by suggesting an offsetting positive social impact in that the people opposed to the project would be permitted to continue their current lifestyle. This supposition is self-serving and unwarranted since (a) the author does not know the lifestyle of the persons in question, (b) the author does not know whether in fact they wish to continue their current lifestyle, and (c) it can be reasonably hypothesized that in any case these persons believe that construction of the proposed project would lead to a deterioration of their lifestyles. The blatant prejudices inherent in this paragraph, and the fact that they were allowed to be published in the EIS, lead inevitably to a suspicion of prejudice running throughout the document.

Several references are made throughout the environmental impact statement to an assumed need to allow people to continue their current lifestyle (e.g., page 3-8, page 3-12, page 3-63). Although lifestyle is not defined, it is apparent that it means allowing people to continue current water consumption patterns. In other words, current consumption patterns have been equated with the most desirable lifestyle. Impacts on the quality of life are then judged according to whether or not current consumption patterns could be maintained. We feel that the above treatment does not amount to an adequate assessment of the impacts on "quality of life".

For instance, a central issue which is not addressed is the fact that Americans have long been accustomed to consuming natural resources at a rate that is no longer acceptable for their own long-term welfare. Continued high levels of consumption could maintain current lifestyles only if our resources were infinite.

Since our resources are not infinite, we will at some point be obliged to alter our consumption patterns. We suggest that it might be a better "quality of life" in the long run if the public were educated and encouraged to husband their resources wisely rather than being allowed to blindly continue on a course of maximal consumption that must end abruptly and drastically at some point in the future. It could well be argued that our "quality of life" would be much improved if we could learn how to lower our consumption rates and plan ahead to leave some resources for the use of future generations.

The analysis of the "principal impact on community lifestyles" (page 3-12) is inadequate and misleading on three counts. First, it assumes that residential horticulture as currently practiced in the Denver area is a key aspect of personal and community lifestyles. Secondly, it begs the question of whether in any case alternative means exist to perpetuate this aspect of community lifestyles. Thirdly, it begs the question of whether the proposed project would create indirect social, economical and environmental impacts detrimental to the health, convenience and well-being of the same persons whose lifestyles, we are told, would be maintained if the project were constructed.

A related issue is the weighing of impacts on recreational use (page 3-56). Again, this is also an aspect of the quality of life. A more adequate treatment of the impacts on lifestyle and quality would weigh this loss of natural area against the opportunity to irrigate lawns on a daily basis. It is not clear that the latter would outweigh the former, especially in the long term future as natural areas become more and more precious.

The issue of lifestyles is important. The quality of life may be improved by altering present lifestyles. This possibility is not even raised and therefore not adequately assessed. Furthermore, the quality of life is limited to a narrow interpretation. The one aspect of maintaining present lifestyles is never weighed against other quality of life concerns implicit elsewhere in the report (e.g., maintaining natural vegetation, wildlife, air quality, visual and archeological resources, etc.), all aspects of "quality of life" in the broad sense.

It is extremely disappointing that the environmental impact statement considered conservation measures only in the no-action alternative. Since Foothills can, at best, delay peak shortage days for only two years (page 8-6), it is imperative that conservation measures be included in any consideration of the project. Statements that the Denver Water Board has advocated residential water conservation since the 1920's are not reassuring. Current levels of per capita consumption do not speak well for the quality of the Denver Water Board's conservation efforts. Metering offers an opportunity for considerable water savings. The City of Boulder has reduced its per capita consumption to 155 gallons per day (a figure which would remove the necessity for the Foothills treatment plant until after the turn of the century if implemented in Denver). However, nowhere in the environmental impact statement is there any commitment on the part of the Denver Water Board to implement universal metering. Other alternatives such as water reuse and the use of untreated water for large land irrigation uses are scarcely considered in the EIS. While we feel that mandatory water restrictions should be used only as a last alternative, we must notice that summer consumption has dropped twenty-seven percent this year by instituting lawn watering restrictions.

It is also possible that fluctuations in demand were evened out, but this would require more research. The peak day use was 358 mgd, but we do not know whether this is just an isolated case or whether there were many days over 300 mgd since June 1.

It is puzzling why an expansion to the Denver Water Board's treated water storage capacity was not considered as an alternative to the Foothills Project. As the following table shows, the Denver Water Board is currently using only a third of its total yearly treatment capacity and only half of this capacity in the critical summer months of June, July, and August.

Percentage of Treatment Capacity Used (1973)

Month	Million Gal. treated	Daily average treatment	% capacity used
January	2,618	84.4 mg	16.2
February	2,388	85.3	16.4
March	2,945	95,0	18.2
April	3,796	126.5	24.3
May	5,792	186.8	35.9
June	7,526	250.8	48.2
July	8,312	268.1	51.5
August	8,148	262.8	50.5
September	5,366	178.8	34.3
October	3,730	120.3	23.1
November	2,781	92.7	17.8
December	2,683	86.5	16.6
Yearly Average			33.5

Source: Denver Water Board, 1973 from Table 2-4 on page 2-7 of the EIS. Acre feet were converted into gallons treated in order to get the percentage of treatment capacity used.

We hope that the foregoing analysis of the draft environmental impact statement for the Foothills Project proves helpful to you in making decisions and proceeding with further studies.

Very truly yours,

Charles G. Jordan
Senior Planner

CGJ/btm

Reviewed:
Philip H. Schmuck, Director

Colorado State Forest Service

Colorado State University
Fort Collins, Colorado
80523

September 13, 1977

Mr. Chips Berry
Department of Natural Resources
1313 Sherman
Denver, Colorado 80203

Dear Mr. Berry:

The Foothills Project Draft Environmental Statement (DES) was reviewed and found adequate in most areas. Since the project would impact a very small amount of the state's forest resource, we felt there was no need for future comment in this area.

In relation to the re-vegetation of the treatment plant facilities, we felt there was no justification for the four acres of blue grass/formal landscaping and associated intensive irrigation. We feel native plants would be most desirable.

The socio-economic strategies described in the No Action Alternative should have been incorporated in a "Water Conservation Alternative". Employment of these strategies, it was estimated (8-11), would enable the present supplies to support a population of 2,222,222 at a per capita use of 117 gallons per day. Further, the DES stated that this use rate could be achieved by the water-rationing-education strategy. It is apparent from the DES' figures that there is no urgent need for the Foothills Project and its associated adverse environmental impacts.

Personal water conservation, water rationing, and metering have shown a valuable savings in 1977. With the strategies approached in the DES, a citizen commitment towards a conservation ethic may be achieved that would preclude the need for additional water supplies and yet maintain very nearly the present "quality of life".

We appreciate the opportunity for the review of the Foothills Project.

Sincerely,

Lorraine Seger
Acting Assistant Staff Forester

LS/js

COLORADO LAND USE COMMISSION

MEMORANDUM

TO: Chips Barry
DATE: September 19, 1977

FROM: Jim Ohl, LUC Staff J.O.

SUBJECT: Foothills Project Draft EIS

The Foothills Project Draft Environmental Statement (DES) does not adequately address the land-use impacts of the proposed project.

1. The analysis of land-use impacts is limited to on-site and adjacent impacts, and there is no discussion or analysis of secondary land-use impacts in the service area, contrary to Council on Environmental Quality guidelines.
2. The relationship of the project to local, regional and state plans is not discussed.
3. The alternatives to the project are inadequately assessed. The project is designed to perpetuate existing land-use patterns, and the DES does not consider alternative land use patterns, including the location, rate, type and timing of urban development, that may affect the location, size and timing of the project and also the need for the project.
4. The DES does not discuss land-use planning and regulatory mechanisms available to local governments to mitigate the direct and indirect impacts of the proposed project.

Based on the comments above, the staff of the Land Use Commission recommends that the State of Colorado ask the Bureau of Land Management not to approve the right-of-way applications until an adequate environmental assessment has been issued and reviewed. The DES provides neither an adequate assessment of the impacts of the projects nor a sufficient basis upon which to grant or deny the application for right-of-way approval.

OFFICE OF THE STATE ARCHAEOLOGIST

1300 Broadway
Denver, CO 80203
303-892-3391,2,3

October 3, 1977

Mr. Philip H. Schmuck
Department of Local Affairs
Colorado Division of Planning
520 State Centennial Building
1313 Sherman
Denver, CO 80203

Dear Mr. Schmuck:

The Office of the State Archaeologist of Colorado has received and reviewed the Draft Environmental Statement for the Proposed Foothills Project (BLM).

Archaeological and paleontological resources are adequately addressed in the Statement, and plans for continuing compliance are appropriate. We have and will continue to offer our assistance to the Bureau of Land Management in efficiently completing required measures (v. P. 4-13).

If we can be of continued assistance, please call upon Staff Archaeologist David R. Stuart. (The State Historical Society's Department of Historic Preservation will independently comment regarding architectural/historical resources.)

Sincerely,

Bruce E. Rippeteau, Ph.D.
State Archaeologist Colorado

Walter Steele

Walter Steele
SHPO (Jefferson & Douglas Counties)

BER:ng
cc: Hart, SHPO
Sherman, Dept. Natural Resources
Andrus, BLM State Director
Wall, Advisory Council Historic Preservation
Beardsley, BLM Dist. Archaeologist

UNITED STATES ENVIRONMENTAL-PROTECTION AGENCY

REGION VIII
1860 LINCOLN STREET
DENVER COLORADO 80203

SEP 2 3 1977

Ref: 8W-EE
D-BLM-J3S003-CO

Mr. Dale R. Andrus
State Director
Bureau of Land Management
Colorado State Office
1600 Broadway
Denver, Colorado 80202

Dear Mr. Andrus:

In accordance with our responsibilities under section 309 of the Clean Air Act and section 102(2)(c) of the National Environmental Policy Act, the Environmental Protection Agency has reviewed the draft environmental impact statement (EIS) for the proposed Foothills Project. This comment letter will address both the adequacy of the draft EIS and the environmental impact of the proposed project as required by EPA's guidelines.

Statement Adequacy

The analysis of site-specific impacts for the proposed Strontia Springs dam and reservoir, Foothills treatment plant (125 mgd), and the associated tunnel and conduits is adequate insofar as EPA's areas of direct responsibility are concerned. However, the failure to recognize and analyze secondary impacts in the Denver area that may occur in part as a result of constructing the proposed Foothills Project is viewed by EPA as a very serious omission. Evidently, your decision not to address secondary impacts was based on your assumption (EIS, page 3-2) that population growth in the Denver area would follow the projections of the Denver Regional Council of Governments (DRCOG) whether or not the Foothills Project were built. We do not agree with the implication that municipal services like a treated water supply do not have an effect on population growth.

In many areas of the country the provision or lack of a single municipal service may not serve to overly stimulate or constrain population growth in a region. However, in the arid West the availability of water has a more significant impact on population growth--cities like Denver, Phoenix, and Los Angeles could not exist without extensive importation of water. The municipal service can also influence development patterns and, more importantly, the rate of development. Congress recently recognized this relationship between growth, environmental impacts, and provision of municipal services in section 316 of the Clean Air Act Amendments of 1977. Section 316 provides that EPA can withhold federal funds for the expansion of sewage treatment capacity that may directly or indirectly contribute to air quality violations from automobiles or other sources. The failure of your impact statement to discuss this relationship between municipal services, rate of growth, and environmental impacts is a major deficiency; therefore, EPA finds the draft environmental impact statement to be inadequate.

Environmental Impacts

The DRCOG-projected year 2000 population of 2.35 million people in the Denver area may be reasonable based on past growth trends and the plans of individual communities within the Denver area; however, unless this growth is accompanied by changes in lifestyles, including a substantially reduced dependence on the automobile, it may not be possible to achieve national ambient air quality standards in the Denver area. The steadily increasing population and continued reliance on the automobile in Denver has made it very difficult to make any headway in improving the air quality of the area. This is of great concern to EPA because of the serious, detrimental effects long-term exposure to Denver's air pollution can have on the health of the area's residents.

If future strategies to greatly reduce the use of the automobile in Denver are not successful, measures that would serve to curb population growth in the Denver area may become necessary. Drastic as this may seem, the unacceptable alternative is continued deleterious effects on the health of area residents. In consideration of the magnitude of Denver's air pollution problem and the difficult choices that must be made to achieve an acceptable level of air quality, EPA believes that expensive infrastructure investments that would serve to facilitate large increases in population are unwise at this time. The ultimate 500 million gallons per day (mgd) capacity of the proposed Foothills Project, plus existing capacity, would accommodate a population of more than double the existing Denver area population, given peak usage rates experienced this summer. Such growth could prove to be an insurmountable obstruction to cleaning up Denver's air, especially if present trends in automobile use continue. (The short discussion of Denver's air quality situation on pages 2-100 and 2-101 of the draft EIS is outdated. The most current studies project extensive violations of air quality standards in Denver well into the future. See Analysis of Air Quality in the Denver Air Quality Maintenance Area, Colorado Air Pollution Control Division, 1977, and Air Quality in Denver Metropolitan Region 1974-2000, EPA, 1977.)

Similar arguments apply to solving water quality problems from growth-related urban runoff in the Denver area which has been identified by the Denver Regional Council of Governments as the major obstacle to the attainment of water quality standards and the goals of the Federal Water Pollution Control Act.

Waterton Canyon is one of the last relatively undeveloped canyons along the front range, and it offers uncommon recreational opportunities to the citizens of the nearby Denver metropolitan area. The South Platte River flowing through the canyon is a highly productive trout fishery enjoyed by many fishermen from the Denver area. The canyon also supports a diversity of wildlife that is unusual so close to a major metropolitan area. As discussed in the impact statement, the canyon is inhabited by bighorn sheep, deer, bear, mountain lion, and an unusually wide variety of smaller mammals and birds, including golden eagles. Additionally, the peregrine falcon and southern bald eagle, both classified as endangered species, inhabit the project area and would very likely be adversely impacted by further development in the canyon. The construction of the Strontia Springs dam and reservoir would have significant impacts on the wildlife habitat and the fishery and recreational values of Waterton Canyon. Furthermore, the severity of the impacts to this unique canyon is magnified by the proximity of the canyon to the Denver metropolitan area.

The need for the Strontia Springs dam and reservoir is questionable since it has not been shown that the reservoir is really a necessary component in any water supply scheme that would increase Denver's treated water supply by 125 mgd. Also, as will be pointed out later, the additional 125 mgd treatment capacity does not even appear to be necessary at this time. In light of the significant impacts to the canyon and the substantial recreational losses that would result from the proposed Strontia Springs dam and reservoir, and in consideration of the apparent lack of a real need for the dam and reservoir, EPA would oppose the issuance of a 404 permit by the Corps of Engineers for the construction of the dam. If additional treated water supplies are needed for the Denver area at some future date, a more exhaustive analysis of alternatives to the Strontia Springs dam should be made (e.g., use of the existing South Platte diversion point and a new, enlarged treatment plant at or near the existing Kassler Plant, enlargement of existing plants, and a treatment plant for the Moffat system located at a higher altitude than the existing Moffat Plant).

The construction of the proposed Strontia Springs dam would serve to lend impetus to the expansion of a Foothills treatment plant to 500 mgd with further development of raw water supplies. The EIS analysis of various concepts for additional raw water development, though cursory, certainly suggests that the environmental impacts would be substantial. The necessary storage reservoir, whether east slope (Two Forks) or west slope, would have significant site-specific impacts including the loss of productive fisheries and wildlife habitat. The diversion of stream flows would severely impact many miles of mountain streams and aggravate existing salinity problems in the Colorado River system.

The total environmental impact of eventually supplying an additional 500 mgd of treated water to the Denver metropolitan area would be very significant and deserves to be looked at and analyzed from a comprehensive perspective. While the draft EIS does address three alternative concepts for raw water development, the level of analysis gives an inadequate picture of probable impacts for a 500 mgd water diversion, storage, and treatment system. As mentioned in the EIS, it is essential for the Denver Water Board (which legally controls the ultimate disposition of imported transmountain water) and other water management agencies to immediately analyze the options for wastewater reuse such as water exchange agreements with agricultural interests. EPA stresses the need to look at the entire 500 mgd diversion/storage/treatment system because the contention that a 125 mgd Foothills treatment plant with a dam at Strontia Springs can stand on its own merits does not appear valid, since there seem to be alternatives to the proposal that would be less costly and more environmentally acceptable.

Other Considerations

In light of the high costs and adverse environmental impacts attendant to the proposed Foothills Project, it seems only prudent to scrutinize the perceived need for additional water closely and to implement any measures that would serve to reduce the demand for additional water before making a commitment to construct Foothills or another water treatment plant.

Since less than 40 percent of Denver's existing treatment capacity is used on an annual average basis, the need for additional treated water apparently is based on the concept that treatment capacity should be sufficient to satisfy all peak demands during the summer lawn watering season. It seems that it is time to question the rationality of paying the high cost of the substantial treatment capacity increment that is required to meet existing peak day demands. Table 1-4 in the draft EIS shows a peak day demand in 1980 of 614 gdc (gallons/day/capita) and in 2010 of 743 gdc, which is more than twice that experienced this summer when a moderate lawn watering conservation program was implemented. (This summer's peak demands of approximately 360 mgd indicate that, with a continued lawn watering conservation program, the existing Denver water treatment system has a 30 percent reserve.) The minor inconvenience involved in scheduling lawn watering is certainly negligible compared to the high costs of providing the extra treatment capacity needed to support the unnecessary practice of daily lawn watering.

In addition to lowering the peak day demand for treated water, all feasible steps to reduce average per capita daily consumption should be implemented before additional treatment capacity is considered. Installing water meters on all homes and instituting a rate structure that discourages water waste could serve to considerably lower the demand for water. A recent study shows that the City of Boulder reduced per capita consumption of water by approximately 25-30 percent when it installed water meters. As discussed in the EIS, there are a number of water saving measures that could be required in new homes and many that could be retrofitted into existing homes. An aggressive program to change the water use habits of Denver area residents seems to be the most acceptable alternative to the proposed Foothills Project.

The water supply available to Denver is finite, and some day this fact must be squarely dealt with by the citizens of the Denver area. The controls that can be put on automotive emissions are limited, and the meteorological conditions of Denver limit the amount of pollutants that can be emitted into the atmosphere without reaching concentrations dangerous to health. These facts must also be squarely dealt with by the citizens of the Denver area. The recent focus on Denver as a hub for increased energy development activities lends urgency to the need to carefully consider the options for Denver's future. Rapid and uncontrolled growth could forever remove many of Denver's options while doing much to destroy some of the amenities that have made Denver and Colorado a desirable place to live in the past.

Building Foothills would give momentum to the construction of Two Forks or another raw water development project. This would bring Denver that much closer to the end of its limited raw water supply. The Foothills Project, along with other infrastructure investments such as highways and sewers, would also provide further impetus to accelerating the rate of growth in the Denver area and sprawl patterns of development. As pointed out previously, it has been difficult to make any headway in improving Denver's poor air quality with the existing population growth rates. At this time, we do not think the private or public sectors of the Denver area (including EPA) are adequately prepared to control the adverse environmental impacts that would inevitably result from accelerating the rate of growth.

We believe that construction of the Foothills Project as proposed poses a potential for significant environmental degradation in the Waterton Canyon area which could be mitigated by other feasible alternatives. We also believe that there is potential for further degradation of Denver's already poor air quality due to population growth facilitated by the Foothills Project. Therefore, it is EPA's determination that the Foothills Project is environmentally unsatisfactory as proposed. As pointed out previously, it is also EPA's determination that the draft environmental impact statement for this project is inadequate. In accordance with our policy to categorize the nature of our review comments, these comments have been designated EU-3.

Thank you for providing EPA the opportunity to review and comment on this draft impact statement. EPA will be contacting your agency in the near future to discuss our comments.

Sincerely yours,

Alan Merson

Alan Merson
Regional Administrator

Water for Colorado

A Citizens' Committee, Inc.
(Formerly Citizens for Sensible Water Use)

1360 S. Clarkson St
Denver, Colorado 80210
(303) 777-7564

1977 STEERING COMMITTEE
Mayor [illegible]
Robert [illegible]
Steve [illegible]
[illegible]
[illegible]
Robert [illegible]
A.S. (Andy) Andrews, [illegible]
A.M. (Dolph) [illegible], Denver
Richard [illegible]
Charles F. [illegible]
[illegible]
Gerald [illegible]
Lee [illegible]
Walter [illegible]
Don [illegible], Lakewood
Joe [illegible]
Jack [illegible]
Richard Gerstberger, Thornton
Herbert C. Gunder, Denver
Ira Hardin, Golden
Hon. E. E. Hayes, Commerce City
Noel Hobbs, Aurora
Robert E. [illegible]
Bob McWhirter, Denver
Bill Moses, Golden
John F. O'Dea, Denver
C.W. [illegible], Lakewood
Lewis E. [illegible], Lakewood
Pete Smythe, [illegible]
Donald [illegible]
Al [illegible], Englewood

The following statement was adopted by the Board of Directors of Water for Colorado, A Citizens' Committee, Inc., on September 17, 1977, for inclusion in the Foothills Draft Environmental Statement hearing record:

Gentlemen of the U.S. Bureau of Land Management, the U.S. Army Corps of Engineers, and the U.S. Forest Service:

Water for Colorado, A Citizens' Committee, Inc., was created more than a year ago as an independent, nonprofit, nonpartisan organization that works to ensure for this and future generations of Coloradans adequate, high-quality water, at a reasonable cost. As you are probably aware, our committee since its inception has advocated the construction of the proposed Foothills Water Treatment Complex.

One of the objectives in the formation of Water for Colorado was "to establish the highest credibility in the eyes of the public and public officeholders as a source of information regarding future water requirements, development costs, the water needs impact of development programs, and the impacts to Colorado of alternatives to development." Throughout the Foothills controversy, our committee has tried to serve as a clearing-house for information. Having sorted out the facts from the rhetoric, we find our support for Foothills stronger than ever.

It has been somewhat discouraging, however, to watch groups opposed to Foothills drag out "red herrings" in an effort to fuel this controversy, to keep their opposition alive by drumming up support for

An independent, nonprofit, nonpartisan organization formed to work for adequate, high-quality water, at a reasonable cost, to meet the needs of this and future generations of Coloradans.

issues which are only distantly related to Foothills, and to play on the emotional concerns of metro Denver residents.

Many of the opposition's charges on September 14-16 are in direct contradiction to sections of the Draft Environmental Statement (DES). For instance, the claim has been made that if we increase the supply of deliverable water in the Denver area, the population and size of our city will increase proportionately, with the converse also being true. Yet the DES clearly points out that whether or not we build Foothills has little or no bearing on the growth rate in metro Denver (page 3-5). The opposition also charges that there exist alternatives to Foothills that could adequately solve our water shortage problem. The DES discusses these alternatives in depth. To anyone familiar with this section of the DES (chapter 8, pages 8-1 through 8-119), it is obvious that the proposed Foothills plant and adjacent Strontia Springs Dam and Reservoir stand out uniquely among these alternatives in that they do not create more problems than they solve.

The opposition's attack has included two even greater distortions of fact: the inevitability of Two Forks if Foothills is built, and the assumption that Denver's raw water supply never will increase.

Throughout this controversy, we have heard much of Two Forks Dam and Reservoir as a domino-like consequence of Foothills. Because of its great environmental impact, its vast size, and its probable high cost, the proposed Two Forks project is a controversial, emotional issue of concern to many Coloradans. Groups opposed to Foothills claim that Two Forks will inevitably follow the water treatment plant's construction, in order to provide sufficient raw water for the Foothills plant to operate at its full capacity -- 500 mgd.

As the DES clearly points out, Two Forks is a distinct, separate issue which would require separate, comprehensive proceedings conducted by

the Bureau of Land Management and the Army Corps of Engineers -- similar to the current proceedings on Foothills -- should it become a proposal (page 1-61). There is nothing inevitable about Two Forks. There are other ways an increased raw water supply could be managed. But those opposed to Foothills use Two Forks as a scare tactic to limit support for Foothills.

The "no new raw water" assumption, conversely, charges that Denver does not have access to enough new raw water supplies to support the building of a treatment plant with Foothills' capacity. If we make this assumption, of course, the necessity for Foothills disappears.

But Denver does have access to plentiful supplies of raw water. To assume, moreover, that the residents of metro Denver are going to sit back and do nothing in the way of obtaining this water is, in the face of a growing necessity, extremely negative and an artificial constraint. Water for Colorado doesn't accept it, and neither will the rest of metro Denver's residents. The water is there; if we don't use it, the lower basin eventually will. The assumption that we won't utilize our resources as they are needed is absurd.

Not only have the groups in opposition to Foothills used these two "red herrings" to rally emotional support for their cause, they have cost the customers of the Denver Water Department -- who will eventually pay for Foothills -- more than $40 million in increased construction costs over the last four years by delaying Foothills' construction. And they have cost the American taxpayer the enormous amount of money that has gone into the preparation of three environmental statements, hearings, and the like.

With the exception of a very few sections, Water for Colorado finds the Draft Environmental Statement more than adequate. The opposition,

naturally, has already threatened to drag the controversy over Foothills out for years with lawsuits. No doubt, they'll use their red herrings to do so. Somewhere, they have mislaid the facts.

September 26, 1977

Attest: Joseph H. Tice
Joseph H. Tice
Staff Assistant

PMD plan metro denver

1100 South Adams Street
Denver, Colorado 80210

September 25, 1977

Plan Metro Denver has reviewed the Draft Environmental Impact Statement for the proposed Foothills Project and finds it lacking in the following respects:

1) Since the initial phase provides no new supplies of raw water, it is unclear whether the project will result in an increased supply of processed water or merely in increased capacity. If only the capacity is being increased, the merits of a more energy-efficient location will have to be weighed rationally against the increase of water prices and the loss of recreation areas. If the actual supply of available processed water is being increased, the following information should be provided:

   a) The amount and percentage of increase should be clearly stated.

   b) Alternatives to Phase One, such as expanding existing treatment plants, should be fully analyzed.

   c) Time should be given for the implications of the Denver Water Board's current restrictions on water usage to be seen. Increased awareness of rational water use may change actual usage during the next decades.

2) The/

PREVENT LITTER
Ecology Paper 100% Reclaimed Waste

2) The second phase of the Foothills Project assumes an additional supply of raw water of between 375 mgd and 500 mgd and yet makes no analysis of the impact on the source areas of supplying this water. Since the placement of the entire project makes little or no sense without the second phase, the EIS must consider the ramifications on the source areas of this great diversion of water.

3) The EIS does not indicate whether the spring at Strontia Springs will be included in the inundated area. If so:

a) If the spring continues to produce water, would the traces of uranium found in it have any effect upon our water quality?

b) If water from the reservoir instead backs up into the spring underground channel, what would be the geological effects? Would there be a significant loss of reservoir water? Could an earthquake result, as appears to have occurred a few years ago in the Denver region when waste materials were forced back into the earth?

4) Although the projected total capacity of the treatment plant after Phase Two is 500 mgd, the Foothills Tunnel leading to it will have a capacity of 710 mgd. Is this greater volume necessary for structural or safety reasons, or is a planned Phase Three omitted from the EIS?

5) Maps are carelessly labeled and misleading in their color keys.

6) Population growth for the area is assumed as a constant, although it in reality depends on DWB water being supplied to the study area (now outside DWB limits), which in turn

depends/

depends upon a real or apparent increase in the water available to the D.W.B.

7. The wind and air pollution information provided in the EIS is outdated and extremely inaccurate. It should be completely revised to reflect the current and future serious implications of settlement in the subject area on Denver's grave air pollution problems.

8. The catastrophe which could result from spillage of toxic materials at the treatment plant during an inversion must require specific regulations and precautions concerning the time of day and year such chemicals can be transported and loaded.

Aside from the above specific points, Plan Metro Denver questions the need to handle Phase One and Phase Two together. If Phase One does not increase actual supply of processed water, the need for it is questionable. Otherwise, alternatives should be carefully considered—alternatives which will be less of a strain economically on the users' pocketbooks and which will preserve for at least 15 years a beautiful canyon used by many thousands of urbanites each year. Planning for Phase Two, on the other hand, cannot be seriously begun until the ramifications of water diversion upon the environment and economy of the source areas have been fully explored.

Submitted for Plan Metro Denver by:

Carla W. [illegible]

Carla W. [illegible]
President

JAMES L. OGILVIE
Secretary-Manager

Board of Water Commissioners
144 West Colfax Avenue Denver, Colorado 80202 Phone 222-5511

COMMISSIONERS
CHARLES F. BRANNAN, President JAMES B. KENNEY, JR., 1st Vice-President
WILLIAM G. TEMPLE JOHN A. YELENICK DON FRIEDMAN

September 23, 1977

The District Director
Bureau of Land Management
Canon City District Office
3080 East Main Street
Post Office Box 311
Canon City, CO 81212

Re: Comments on the Draft Environmental Statement for the Proposed Foothills Project

Gentlemen:

On September 14th, Mr. Charles F. Brannan, President, Denver Board of Water Commissioners, presented testimony on the above captioned subject manner. In that testimony, he promised that detailed written comments would be provided to the Bureau of Land Management within the time available for receipt of written comments.

The purpose of this letter is to transmit those written comments which are attached hereto. If you have any questions concerning these during your review period, please do not hesitate to contact us.

Sincerely yours,

J. L. Ogilvie

J. L. Ogilvie, Manager
JLO/jai

DETAILED COMMENTS

Summary, Paragraph 3: The first sentence is poorly written. It should read, "Results of the proposed action would include the change of 1.7 miles of free-flowing river to flat water, 1,753 additional tons of sediment will be trapped behind the Strontia Springs Dam, most of the historical Narrow Gauge Railroad Bed features and about 18,000 recreational visits to the canyon during the construction. . ." None of the positive impacts of economic growth, quality of life within the metropolitan area, lack of watering restrictions, and economic benefits of this project are mentioned. Additionally, this seems to overemphasize the negative impacts of the project.

Probably the most grossly over exaggerated adverse impact the Draft Statement attributes to the construction and operation of the project is the predicted loss of up to 50% of the native Bighorn sheep herd. The reason the Statement presents such a distorted view must necessarily be because those responsible for evaluating that impact rather than learning from those with years of knowledge and experience in dealing with Bighorn Sheep generally and the Platte Canyon herd in particular, chose to rely upon academic inquiries and hearsay statements about the effect of construction activities on such a herd.

Mr. John Boaze of the United States Fish and Wildlife Service who is responsible for the material in the Statement relating to the Bighorn sheep herd testified in a recent deposition that he had mede no attempt to verify the probable adverse impact on the herd but had relied on studies by others who had opined that a significant herd loss had occurred during the construction activities in the Canyon in the 1960s. He did not know whether the studies he relied on had been made during the period of time that the construction had been going on.

Moreover, there was genuine confusion as to the number of sheep currently in the herd, with the result that the estimate selected for inclusion in the Statement of 60 to 65 animals represented simply a compromise to resolve conflicts among the number of animals reported by different people at different times.

The loss, predicted to result from the construction work, is also a product of guesswork.

The reasons given for the predicted loss included a fear that the noise associated with blasting would frighten the animals and, when combined with the harassment expected to result from the presence of people would cause them to crowd into smaller areas, impair their breeding activity and cause the spread of disease associated with the lungworm infestation. Finally, a significant portion of the loss was predicted to result from illegal poaching by the construction workers.

Unfortunately these conclusions were drawn from the results of studies done by academicians in 1973 and 1974 whose analysis had not been verified by actual experience during the periods of time when the events upon which they relied for their judgment occurred. When their conclusions were discussed by the team working on that portion of the Draft Statement, additional conjecture and speculation, rather than scientific evidence added to the confusion and the understandably hopelessly incorrect result. (See attachment 1A, Boaze deposition of August 16, 1977, pages 90 through 99).

By contrast, if the study team had chosen to search for herd evidence from those who are experienced and competent in the actual management of Bighorn sheep they could readily

have found them and would have developed a significantly different, albeit infinitely more reliable, data base. It would have been relatively easy and not excessively time consuming to have sought the advise of George W. Jones, who for 31 years has been actively in charge of Bighorn sheep herd management and translocation throughout the State of Colorado, a copy of whose deposition appears as Attachment 1B. If the Team had been truly concerned about verifying the Platte Canyon loss attributable to illegal poaching, it would have consulted with William J. Forgett, a long time Game Warden and Wildlife Conservation Officer with experience in the area whose deposition is attached as Attachment 1C and Mr. Herman Schultz, Game Warden and Wildlife Conservation Officer who had jurisdiction over the Platte Canyon area during the period of the 1960's when previous construction occurred in the Canyon. His deposition is attached as Attachment 1D. The Team assembled to write the final Environmental Impact Statement should study those depositions carefully along with the statement of Mr. C. N. Feast, a long time Director of the Colorado Game and Fish Department, which is attached as Attachment 1E.

All four sources concur in the statement that construction activity per se will have no direct effect upon animal mortality. Mr. Jones in particular described a similar occurrence in relation to the construction of the Taylor Dam on the Gunnison River when he said:

> "A: Well, you know at the Taylor Dam on Gunnison, you can always see that bunch of sheep. They watched the whole procedure all the time they was building that Dam.
>
> "They would leave for a day or two. There was a lot of dynamiting going on, but they would all be back and they never left there. The herd was there when we started and they are still there."

Later, in response to a question as to whether he might anticipate a loss of a number of the herd because of the construction activity, he responded by saying:

> "A: No, I think they would move out for awhile and then they would get used to it and then they would gradually move back in there. They are curious, alot of the time. They will stand around on high ridges and mountains and watch the construction. It doesn't bother them at all.
>
> "When they built the Taylor Reservoir they were up there on that hill day in and day out* * *"

When asked whether construction activity might have any adverse effect on the breeding habits of the Big Horn sheep, Jones replied:

> A: No, I don't think so, because when that rut takes place, there is nothing going to disturb them at all * * *, but construction doesn't bother them, unless you are talking about thousands of people, and you are not going to have that many people in there at one time.

With respect to the reports of a major loss of animals resulting from illegal poaching during the construction periods in the 60s, Jones indicated that individual isolated occurrences would not have come to his attention but that a major loss in the Platte Canyon herd from such poaching would surely have been brought to his attention.

Both Forgette and Schultz, the law enforcement officers in the area, indicated that poaching in the closed canyon was relatively difficult. Schultz, who had jurisdiction over the area from the latter part of 1959 up until almost 1970 had no more than six cases of sheep poaching, only two of which occurred during the construction of the Aurora Project. Because of the manner in which those poachers had been apprehended, Mr. Schultz was fearful that other animals may have also been taken illegally but he had no evidence one way or the other as to whether any other sheep had actually been lost to that activity. Schultz was also of the opinion that if worker access to the construction site were provided by bus and controlled, the risk of loss from worker poaching would be essentially eliminated.

Feast in summarizing his experience and that of the others concludes that the project activity need have no

adverse effect upon the herd itself and recognizes as does George Jones, that if the activity disturbs the herd, it would be a temporary disturbance causing the animals to migrate along its traditional patterns as set forth in the Jones deposition.

In recasting the section involving the impact of the Project on the Bighorn sheep herd, Page 3-33 et seq., the BLM must take into account the knowledge and experience of these men which is now available to the BLM and produce a competent final statment which recognizes and clearly describes what a minimal effect the construction activity will have on the Platte Canyon herd.

Summary: The page following the summary page which has a listing of federal, state, local and private entities appears to be out of place at this point.

Page 1-1, Paragraph 1: The Introduction should be amended to reflect the enactment of the Federal Land Policy Management Act and that as a result the Forest Service will also have to issue a permit for the right-of-way. See the discussion on Page 1-9 under the heading "United States Forest Service."

Page 1-1: After the second paragraph, an additional paragraph should be added which states the following:

> The Foothills Project is of critical importance to the Denver Metropolitan Area. The Project will not only make available expansion of the existing system, but will also correct deficiencies in the system as it exists. Briefly, the problem that the Foothills Plant addresses is the problem of distribution of supply. While nearly half of the Denver Water Board's treatment capacity is on the north end of the system, only thirty percent of the raw water is delivered to the north end of that system. Nearly three times the amount of available raw water flows into the Denver system from the south. Because there is no raw water intertie capability between filtration plants, the southern system must be the place where filteration capacity is added. See additional comments on p. 1-14.

Page 1-1, Paragraph 3: The statement reads, "The proposal also includes an intertie conduit with the City and Aurora's raw water system." COMMENT: The sentence should read, "The proposal also includes an emergency intertie conduit with the City of Aurora's raw water system."

Page 1, General Comment: Two items should be clarified on the first page of the report. First, the report fails to specify how many acres of BLM administered public land and National Forest Lands are involved with the Denver Water Board's proposal to build the Foothills Complex.

The discussion of the BLM's actions implies that tremendous amounts of federal government lands would be involved in the Foothills Project. It would be appropriate for te EIS to state early in the summary that the federal action involved in this project regards rights of way needed for a minimal amount of federal lands and improvement of the access road and that no federal expenditure of funds will be required.

Secondly, there is contradictory information concerning the location of the proposed site. The first paragraph states that the plant would be located approximately 25 miles Southwest of Downtown Denver. In the last paragraph, the location is given as 16 miles to the Southwest of the service area. One single location description should be used throughout the project.

Page 1-3, Map 1-2: The Platte Canyon access road from the present Platte Canyon intake upstream to the so-called Keystone Bridge is shown on the map as being a 14 foot road with turnouts including power and telephone lines. This segment of the Platte Canyon access road should be proposed for improvement to 22 feet to comply with safety considerations.

Map 1-1: COMMENT: Throughout the EIS some maps have page numbers and some do not. One consistent policy should be followed for ease of reference.

Map 1-3: This map is supposed to refer to the "Proposed Foothills Project." For this reason it seems inconsistent to indicate the "Chatfield Alternative" on this map.

Page following Map 1-4: This page is not marked with a page number.

Page 1-7, Paragraph 1: The first full paragraph references a ruling by the Regional Solicitor. We are not aware of any such ruling. On or about the referenced date, however, the Solicitor did issue a memorandum on this subject. We suggest that this paragraph be rewritten and corrected to coincide with the substance of that memorandum.

Page 1-7, Paragraph 2: The reference to the Under Secretary should be corrected to reflect that the correct title is the Assistant Secretary of the Department of the Interior.

Page 1-7, Paragraph 3: This introductory paragraph should be expanded to make it clear that this Environmental Impact Statement is being prepared by the BLM in its capacity as the "Lead Agency" within the meaning of that term as used in the Council on Environmental Quality Guidelines, 40 CFR Part 1500, and that this Environmental Impact Statement will suffice as the necessary document within the meaning of Section 102(2)(C) of the National Environmental Policy Act and that following the requisite time periods, the individual agencies will be permitted to proceed with the required federal actions.

Page 1-7 through 1-10: Descriptive language under the heading "Bureau of Land Management" on page 1-7 and continuing on page 1-8 as well as certain corrections in tables 1-1 and 1-2 and figures 1-6 and 1-7 should be made in the final Environmental Impact Statement to reflect the amended applications for rights-of-way which will have been filed by the Denver Water Board.

Page 1-11, Paragraph 1: Strike the "s" from the word "services."

Page 1-11, Paragraph 2: The "Corps of Engineers" description should be modified to reflect the needed 404 permit for conduit 27 as described in the Environmental Statement on pages 1-55 and 1-56.

Page 1-11, Paragraph 2: Use of the phrase "navigable stream" should be explained. The third sentence of this paragraph should end as follows, ". . . and the South Platte River is defined as 'navigable' within the Federal Water Pollution Control Act even though it is not navigable in the traditional sense."

Page 1-11, Paragraph 4: The paragraph should be reworded and commence with a sentence that states, "In order to comply with the Federal Water Pollution Control Act of 1972 (PL 92-500), and the Colorado Water Quality Act the DWB or its contractor(s) must apply for a stream discharge permit . . . ." Additionally, this paragraph should point out that the requirements will also apply to the conduit #27. In light of these laws, the second sentence in this paragraph should be stricken; a violation of stream standards is not permitted, conditions of the permits assure that standards are protected.

Page 1-12: Page number is missing.

Page 1-12, Paragraph 3: The paragraph uses the phrase "DWB would have to obtain . . . ." This should be changed to read "DWB may have to obtain special land use permits . . . ."

Page 1-12: Under the heading Purpose and Need, an additional paragraph should be inserted after the first paragraph which indicates the need for the structure by the City of Aurora. The paragraph could read as follows:

> The proposed Strontia Springs Diversion Dam and Reservoir would also be an integral part of the City of Aurora's water supply system. Since the entire City of Aurora is dependent upon the South Platte River for its water supply, this permanent diversion facility would form a vitally needed permanent solution to Aurora's diversion needs. At present, Aurora has only a temporary diversion structure in the South Platte River and without this project would be forced to build its own permanent diversion structure in the South Platte River. By utilizing the Strontia Springs facility, Aurora is able to divert water while minimizing environmental damage to the canyon by duplication of diversion facilities.

Page 1-13, Table 1-3: Under the column labeled "Required Authorization" the sixth item should be corrected to read, "water quality certification and discharge permit" from the Colorado Department of Health.

Under the column "Required Authorization" the eleventh item should be corrected to read, "water quality certification" from the Colorado Department of Health.

Page 1-13, Table 1-3: A "Project Component" relating to conduit #27 (see page 1-55) should be added. In this regard, a "water quality certification" from the Colorado Department of Health and a "Section 404 permit" from the Corps of Engineers should be itemized.

Page 1-14, Paragraph 3: Delivery of treated water to DWB customers involves three factors not two. The third factor is "system operational constraints." It is suggested that language dealing with this aspect of the water supply problems be included as part of the schematic narrative.

> The third aspect of water supply is system operational constraints -- the operational constraints which limit the system's ability to serve all of the customers in times when the raw water supply is anything less than average.
>
> The current DWB Treatment System is composed of three treatment plants with the total combined apparent treatment capacity of 520 mpd. The term apparent has been used because of operational constraints in the current Denver system. By way of illustration, a simplified description of the filtration system may serve as a useful tool. In reality, since there are no raw water interconnections between supply systems, the current Denver supply system should be separated into two distinct parts; the South System and the North System. The North System feeds water exclusively to the Moffat Treatment Plant which has a capacity to treat 210 mgd of water per day. The South System which feeds the Marston and Kassler Plants has a combined treatment capacity of 310 mgd. The South System has a reliable annual yield of an average of 220,000 acre feet while the North System only has average reliable yield of 92,000 acre feet. These yields in normal years do not create a problem but in any year in which the Moffat Supply System is less than normal, resulting shortages seriously affect the DWB system's ability to deliver treated water.
>
> If for instance the North System's raw water supply is cut in half by natural conditions, as was the case in 1977, it can be seen that the effect would be to reduce the amount of raw water available to the Moffat Treatment Plant. With this small amount of raw water available to put through the treatment plant, and with raw water delivery commitments coming from the North raw water supply it can be seen that immediate measures would have to be taken to insure that the Moffat Treatment Plant was to be operated only as a peak-load plant. Even with Moffat operating as a peak-load plant, it is quite possible, without Foothills, that the Moffat Treatment Plant could totally exhaust its raw water supply by July if volume restrictions were not placed on the system to insure that the Moffat supply was not depleted during the summer. In other words, the base-load capacity of the system to be realistic could be reduced by 210 mgd down to a total of 310 mgd.
>
> This, too, is only apparent capacity because of operational constraints in the Southern System. Marston Reservoir is a terminal settling reservoir which receives raw water out of a 210 mgd capacity conduit from the Southern System. The treatment capacity of the Marston Filter Plant is 260 mgd. Since the Marston Reservoir has finite capacity, and the Marston Filter Plant on days of high base-load demand must treat close to its capacity of 260 mgd, it can be seen that over a long period of sustained high demand, Marston Reservoir's useable storage would be depleted. After the Reservoir is depleted, the capacity of the Marston system is only as great as the capacity of its smallest link. In this case, the conduit bringing raw water to the Marston Plant with a 210 mgd capacity is that link. After Marston Reservoir has been depleted, the Marston Treatment Plant capacity after many days of high base loads becomes 210 mgd.

> From the foregoing illustration, it can be seen that because of system constraints the Foothills Treatment Plant is of critical importance to supply the system demands during periods of high base loads. The addition of Foothills will allow other, less reliable plants to operate at their optimum efficiency even with their system induced constraints.

Page 1-14, Paragraph 5: The fifth line from the bottom states that "This shortage, if caused solely by inadequate treatment capacity, is only an apparent one." The use of the word "apparent" leaves the reader with the wrong implication. When treatment capacity is inadequate it causes a shortage in the system; those without water because of this occurrence find the shortage to be most real and not "apparent."

A. It is suggested that this sentence read as follows, "This shortage is caused solely by inadequate treatment capacity."

B. On what appears to be page 1-18 (again this page is not paginated), the same use of words appears in the third paragraph. It is suggested that the word "apparent" be eliminated.

C. It is suggested that some of this paragraph will have to be reworded to allow for the addition of the paragraphs on "operational constraints."

Page 1-15, Map 1-5: The shaded area is an overlay and should be indicated on a base map. The list of water districts should state "3 Willows Water District." Also, Arvada and North Table Mountain Water and Sanitation District should be indicated.

Page 1-17, Table 1-4, Footnote 1: The assumption stated in footnote 1 is valid and one for which the metropolitan area is planning.

Table 1-4, Footnote 2: The statement concerning the assumption about trend analysis is very misleading. It must reference the actual mathematical formula used to have any meaning at all. Without reference to this regression analysis, all projections lose any relationship to sound utility practice. See Attachment 2.

Page 1-16, Map 1-6: The overlay should be placed on a base map. The Willows Water District should be indicated.

Table 1-5: The values under the heading "Number of Days When Demands Exceeds 520 mgd" present the numbers 13, 31, 63, and 73. These values should be changed to read 15, 40, 64, 105, and 134 respectively. This change is based on recent updates of the material contained in the DWB's "Methods of Meeting Max Day Consumption Requirements." It should be noted that these values are merely statistical values at which demand can exceed a chosen value of 520 mgd. During periods when delivery capacity is reduced by the operational constraints mentioned earlier more days of demand exceeding delivery capability will occur than are shown by the values indicated above.

Page 1-18: The page number is missing.

Page 1-20: The page number is missing.

Page 1-20, Paragraph 1: The sixth line of the first full paragraph reads in part ". . . (for producing treated water at the rate of 760 mgd)." This should read as follows, "(for producing treated water at the rate 760 mgd, however, treated water can be produced at the rate of 810 mgd provided there is water in storage in Marston Lake.)"

Page 1-20, Paragraph 4: The last sentence should be changed to read ". . . at the 500 mgd level would be 63.9 million kilowatt hours."

Page 1-21, Paragraph 1: This paragraph implies that the proposed project cost at the 125 mgd capacity is about $234 million (1976). This must be a typographical error. The cost is approximately $134 (1977). It should be noted that on page 7-3 the sum of the project costs at 500 mgd is shown as an amount of $264,623,000.00 which is misleading. (see our comments regarding this page, *infra*.) See attachment 3 hereof which provides the Foothills Cost Summary for the proposed project at 125 mgd. The last sentence of this paragraph should be changed to read, "Table 1-6 reflects total resources which would be committed to the project construction at 125 mgd and at 500 mgd."

Page 1-27, Second Line From The Bottom of the Page: Word "designed" is misspelled.

Page 1-27, Paragraph 3: The statement reads, "Slide gates and trash racks would be located on four faces of the DWB structure and three faces of the Aurora Structure and be set at distances of approximately 23 feet apart." COMMENT: The statement should read, "Slide gates and trash racks would be located on four faces of the DWB structure and three faces of the Aurora Structure and be set at vertical distances of approximately 23 feet apart."

Page 1-31, Paragraph 5: The description contained herein of the water turnover at the reservoir can be further refined in accordance with attachment 4 hereof.

Page 1-53, Table 1-10: In the second and third columns under "Quantity As Dry Solids," it appears that "(1 lb/day)" should be "(lb/day)" and that the figures "125 mgd" and "500 mgd" should be moved to the bottom line.

Page 1-55, Paragraph 1: With regard to references made herein to the crossing of Plum Creek by Conduit No. 27, the description should be expanded to indicate that a water quality certification from the Colorado Department of Health and a "Section 404" permit from the Corps of Engineers will be obtained prior to the crossing.

Page 1-56, Paragraph 1: The statement that the second conduit will be laid 10 feet away and alongside Conduit No. 27 is incorrect. Since the topography and thus the depth at which the conduit will be placed is variable, the space between conduits varies accordingly. Thus the statement should read, "The second conduit will be laid adjacent to conduit #27 within the same right-of-way."

Page 1-57: Under the heading "Existing Non-Federal Projects," the word "Vasquez" is misspelled.

Page 1-59, Paragraph 1: The second sentence should be amended to read as follows:

> In accordance with the Blue River Decree, Green Mountain Reservoir, having storage rights senior to Dillon Reservoir, is entitled to be filled one time each year by runoff originating within the Blue River Water Shed before any of that year's runoff may be stored in Dillon Reservoir which is upstream of Green Mountain Reservoir, unless Denver exercises its rights under the Colorado River Compact to its domestic preference. (See additional comments on Green Mountain Reservoir, re: page 2-23, infra.)

Page 1-59, Paragraph 4: The statement reads, "Mount Carbon Dam under construction and located on Bear Creek . . . ." The statement should read, "Bear Creek Lake Dam under construction and located on Bear Creek . . . ."

Page 1-61, Paragraph 3: The last sentence of the paragraph should be amended as follows, ". . . project, further federal evaluation would be required to comply with federal statutes and, in particular, the National Environmental Policy Act."

Page 1-61: In light of the statement regarding the interrelationships with the Bureau of Land Management multiple use planning system in the study area, it seems appropriate to add an additional heading entitled, "Interrelationships with U.S. Forest Service Mutliple Land Use Plan for the Study Area." Under this section, the statement should be made to point out that the proposed project is not inconsistent with the existing multiple land use plan for the Pike and San Isabel National Forest, as stated in a letter from Forest Supervisor Ridings in his memorandum dated April 14, 1975 addressed to the Regional Forester. See Attachment 5. On August 31, 1977, Mr. Ridings testified under oath that this is still this opinion (Ridings 1977).

Page 2-1, Paragraph 2: The second sentence in this paragraph is confusing as written. It should be rewritten as follows:

> It includes a linear area extending from Highlands Reservoir in Littleton southwesterly to the proposed treatment plant site near Roxborough Park, and the South Platte Canyon from Chatfield Reservoir to South Platte. The North Fork of the South Platte River, Dillon Reservoir, the Blue River and the South Platte River below Denver are affected to a much lesser degree.

Page 2-1, Paragraph 3: COMMENT: The source for the population statistics should be consistent if possible. The 1975 Denver Water Department service area population comes from the Denver Regional Council of Governments, all others come from the United States Bureau of the Census.

Page 2-5: COMMENT: The description of the existing system is incomplete in that it totally ignores treatment and operational constraints which dictate system operation. See discussion of Page 1-14.

The treated water storage capacity is given as 287.8 million gallons. It is implied that all of this is useable, and all calculations and tables dealing with consumption assume this. In fact only 177 million gallons are useable. Fire reserve and facility operation require that no less than 100 million gallons be retained in the reservoirs. Any deviation from this could spell disaster for any part of the service area and in particular the downtown areas where a major fire could effect whole blocks. All tables and calculations which use these volumes should be changed to reflect useable storage only.

The treatment capacity is correctly listed as 520 million gallons but it is assumed that this figure is firm. This is true only if perfect raw water conditions exist which is often not the case. Kassler treatment plant which utilizes slow sand filters must be all but shut down when raw water turbidities are greater than 40 FTU for any extended period of time.

The Marston treatment plant which also experiences operational constraints is influenced in two ways; by the micro strainer units and the filter run times. The micro strainers pass the same turbidity which is input to them. The federal water standards for turbidity will not be met if extended runs at high rates are required. In times when the reservoir is drawn down, as would be the case when a high base load exists, the plant would be subjected to excess turbidities. This turbidity would reduce filtration capacity in direct proportion to the amount of water present because the mixed media filters could not be washed often enough to maintain filtration capacity. Turbidity can either be caused by the raw water which is supplied, or a wind whipped reservoir which is drawn down below optimum capacity.

The assumption that the system is capable of delivering the 520 mgd for an extended period of time is a shortcoming of the EIS. It must be emphasized that any extended 520 mgd capacity is possible only when conditions are perfect which is rarely the case. The distribution system contains 30 pressure zones and 32 pump stations which dictate the extent to which the load can be shifted and water supplied to the 18 different clear water reservoirs. Operational situations such as a power failure, which have occurred in the past, can seriously effect the system's ability to continue peak operation. When a reservoir is drawn down to the reserve limit and the demand continues, that reservoir is effectively lost. The reservoir does not become available again until demand slackens to the point that the reservoir can be refilled.

In short, the simplified approach to the treatment and distribution system must be changed to take into account reality and actual system operational constraints. The earlier discussions concerning the inadequate evaluation of operational constraints emphasize that all tables which do not account for this factor will be misleading. Any information in the EIS which was developed assuming that the days depicted in Table 1-5 are the sole number of days that deficiencies will exist is erroneous. It is our understanding that the shortages shown in Table 2-30, Page 2-94 were based on the number of days shown in Table 1-5. The result is an understatement of the problem without the proposed Foothills project.

Page 2-5, Paragraph 2: The statement reads, "Treated water stored within the DWB transmission system was used to satisfy the additional demand." COMMENT: This referred to the 1973 max day of 506 mgd. The statement should go on to say that "Reductions of pressures and other operational problems occurred as a result of this overextension of system capacity."

Page 2-5, Paragraphs 3 and 4: "gdc" is used to indicate gallons per capita per day. The normal abbreviation for gallons per capita per day is "gcd." The D.E.S. uses the term annual gallons per capita per day use of water (gcd) in various tables and portions of the report. The figure is derived simply by dividing the annual water consumption by the population for that year, and further dividing by 365 to obtain a daily value. The result is a value which by its derivation strongly implies the average daily use of water by an individual. This is totally incorrect.

It must be stressed that annual consumption of treated water in the Denver Water Department's service area is delivered to many types of users. Residential, commercial, industrial, master meter, government agencies, construction, and fire protection are examples. For the period 1957 through 1974, an average of 25% was used by commercial and industrial users alone excluding that amount of commercial and industrial use under master meter contracts. Obviously, the use of a gallons per capita per day computation to indicate water used by individuals is misleading. Further, when comparisons are made between gcd results at various

points in time, and the conclusion is drawn that an individual's water use is being lowered or raised by the resulting difference, the conclusion may very well be false.

These comparisons using gcd become particularly misleading when values for different cities are used to draw conclusions that individuals in one city use more or less water than individuals of another city and that one city's population wastes water or another city's population are great conservers of water because different cities deliver and measure water deliveries in entirely different ways.

It is our strong suggestion that these problems with the meaning of gcd be clearly described and that any conclusions on individual water use be avoided entirely.

Page 2-5, Paragraph 4: If a gallons per capita per day figure must be used, instead of using the DWB 1973 Annual Report, the 1976 Annual Report should be used. The Statement should be corrected to indicate that the average annual gcd for the 1971-76 period is 214 gcd, not 181. See Attachment 6 .

Page 2-9, Paragraph 4: COMMENT: The paragraph entitled Law Enforcement offers no relevance to a study of this proposal, and could be eliminated from the report.

Page 2-10: The entire Community Attitudes section is irrelevant as presented. It should be rewritten if the section is in fact called for at all. A suggested rewrite would be as follows:

> A 1976 Louis Harris poll of national attitudes on home buying revealed that the biggest concern of a prospective homeowner is the horticultural environment in the immediate vicinity of his prospective dwelling. More people were concerned about the availability of green grass and trees than they were about any other concern including the accessibility of stores, churches, and the

> potential character of the prospective resident's immediate neighbors. When asked what the most important consideration was in the area where they were to live, 95% responded, 'green grass and trees around me,' 92% responded that the quality of the neighbors was important, 84% responded accessibility to shopping, etc. (Harris 1976).
>
> A BLM staff summary of media reports on community attitudes towards this proposal shows that attitudes cover the entire spectrum. Within Denver County, the bond issue for $160 million in capital improvements of which the Foothills Treatment Plant was one item was voted on in 1973. In November of 1973 with 24% of the electorate turning out, 56% or 39,270 voted for the improvements and 46% or 30,800 voted against the improvements. This 24% voter turnout was significant, because for single issue elections, voter participation in the preceding 20 years averaged only 21.16%. [Denver Election Commission]. It can be stated that the question of water facilities improvements attracted widespread voter interest and was approved by a substantial margin.
>
> A survey conducted from August 31 to September 4, 1977 of people in the metropolitan area showed that water facilities are of great concern to the people of the metropolitan area. The survey showed that over 50% of those polled were in favor of building the facilities necessary to deliver the required amount of treated water to the metropolitan area even if they had to pay for it themselves when it was determined that those facilities were needed.

The Statement should also be corrected to reflect the testimony of Mayor Wm. McNichols and Mr. Robert Tonsing on September 14, 1977 as they pertain to this section.

Throughout the entire Community Attitudes section of the Statement, the language should be re-edited to remove the obvious anti-project bias. That bias apparently crept into the draft after Dr. Douglas, the social scientist responsible for the section, had submitted his work to the team for editing. See his deposition comments about the editorial distortions in attachment 7 .

Page 2-12: All reference to the Carley Study should be eliminated since this study is out of date.

Page 2-14: The conclusions in the first paragraph about the value placed on irrigated areas can also be based

upon the Louis Harris poll mentioned in the suggested rewrite of page 2-10 supra. In addition, there was oral testimony by Herb Gundell and Robert McWhinnie on September 14, 1977 which indicates that $2,000.00 per dwelling unit is too low since replacement value now greatly exceeds that amount.

Page 2-15, Paragraph 1: The last sentence now reads, "It is stored in Gross and Ralston Reservoirs and from there is transported to pipe lines to the Denver Water Board raw water users in the Moffat Treatment Plant." The statement should be modified to say, "It is stored in Gross and Ralston Reservoirs and from there transported through pipe lines and canals to the Denver Water Board and raw water users."

Page 2-15, Paragraph 3: Sixth line down; the word "or" should be changed to the word "and."

Page 2-15, Paragraph 2: The second sentence should be removed as being redundant.

Page 2-15, Paragraph 3: COMMENT: The entire paragraph has been stated in the preceding two paragraphs except for the fact that the capacities are listed and reference is made to Table 2-7. Possibly the capacities and references should be stated in the upper paragraphs to eliminate the need for this paragraph.

Page 2-15, Paragraph 4: The Williams Fork Reservoir, at this point, is not considered part of the Moffat System. It should be explained that Williams Fork Reservoir is a replacement reservoir.

Page 2-16, Last Paragraph: COMMENT: There is no reference made in the listings of the irrigation diversions. These should be included to make the chart complete.

Page 2-17, Paragraph 5: The reference to "(Table 28)" should be changed to read Table 2-8.

Page 2-18, Table 2-8: An additional diversion should be added to the Table: DIVERSION NAME: Nevada, (out of Chatfield Reservoir), OWNERSHIP OF THE DIVERSION: Denver Water Board, Englewood, and others 2/, WATER USE: Municipal, Industrial, and Irrigation.

Page 2-19: Fifth line on the page, change the word "Ramparts" to "Rampart."

Page 2-19, Paragraph 2: The statement reads "Water obtained from Soda Lakes is conveyed to Marston Lake by the Harriman Canal." COMMENT: The statement should read, "Water obtained from Soda Lakes is conveyed to Marston Lake by the Harriman Canal or exchanged to the South Platte intake structure."

Page 2-21, Paragraph 2: The statement reads, "Marston (260) . . . ." The statement should read, ". . . Marston (260 mgd) . . . ."

Page 2-23 Paragraph 1: The statement reads, ". . . for the period 1964 to 1973 averaged 187,500 acre-feet annually." The statement should read, ". . . for the period 1964 to 1973 averaged 198,961 acre-feet annually." The next sentence reads, ". . . was 50,400 acrefeet in 1967." The statement should read, ". . . was 49,000 acre-feet (which does not include seepage) in 1967."

Page 2-23, Paragraph 1, Second Sentence: The word "feet" is misspelled.

Page 2-23, Paragraph 4: The paragraph should be changed to read as follows, "Stipulations for the operation of Dillon Reservoir require release of natural inflow or 50 cfs, whichever is less, or smaller flows in times of water shortage."

Page 2-23, Paragraph 5: The entire paragraph should be deleted and the following language substituted:

> The Blue River Decree also provides that if, in a given year, Green Mountain Reservoir does not fill from runoff originating downstream of Dillon Dam and from spills from Dillon Reservoir, the DWB must release the amount of water necessary to fill Green Mountain Reservoir from water which was stored during that year in Dillon Reservoir, unless Denver is exercising its domestic preference under the Colorado River Compact. Dillon Reservoir was filling during 1964 and 1965. Average annual flows in the Blue River downstream of Dillon Dam during the 1964 to 1973 period were 143,500 acre-feet.

Page 2-24, Table 2-12: The column reads "Minimum Content During Year." For the values to be accurate, the column should read, "Minimum End of Month Content During Year."

Page 2-25, Table 2-13: Footnote #1 applies only to the 298,000 figure. Homestake Project water does not flow in the North Fork of the South Platte River. Therefore, another footnote should be added which applies to the flows under the "average annual runoff" column (79,000 and 143,500) the narrative of which should read "includes historical Roberts Tunnel imports from Dillon Reservoir."

Page 2-26, Table 2-14: Under the column entitled "Date" there is no "fourteenth month." This should be corrected. It should also be clarified that 12-5-99 refers to the year 1899.

Page 2-30, Paragraph 4: The second and third sentences thereof should be stricken and more up-to-date information provided. In the draft "Denver Regional Environmental Impact Statement for Waste Water Facilities and the Clean Water Program" published in June, 1977 by the Region VIII, of the U.S. Environmental Protection Agency, it states that the achievement of the goals of the Federal Water Pollution Control Act will not be hindered as a result of point source discharges. In other words, either a sufficient level of waste water treatment is on line or are proposed to be on line within the time frames required by law.

Page 2-37: The first sentence states that ". . . the river is still a highly productive sports fishery (Table 2-20)." Use of the term "highly" indicates a subjective conclusion. It is suggested that this adjective either be dropped or the benchmark provided for concluding that "highly" is the proper term. (The number of pounds of fish would be helpful here.)

Page 2-37, Paragraph 4: As noted in this paragraph Ten Mile Creek has been completely rechanneled to accommodate construction of Interstate 70. The U.S. Forest Service and Colorado Division of Wildlife expect this total change of stream bed to increase the natural recruitment of trout into Dillon Reservoir. It seems incongrous and contradictory to state later within this EIS document that far less construction activity in the South Platte stream bed within the proposed Foothills project site will impact so negatively on the South Platte River and its fishery.

Page 2-38, Table 2-20: This table has been completely misquoted; the wrong numbers have been used, the order of the numbers has been rearranged, there are major omissions, and the axis of the table has been switched. This table is inaccurately copied from the source quoted. Additionally, there have been alterations to the table which are not explained in the text. These changes were apparently made to give the original tables added credibility. Example: Table 2-20 appears in the source quoted as Table A-6 pg. A-15. In study Section 2,- Rainbow Trout - A zero (o) recapture of marked fish is noted. Therefore, no population estimates for that species could be made in that section. However, such a value is presented; but in the draft EIS no estimate is shown. The table must be corrected or deleted.

Page 2-39, Table 2-21: The number of fish per acre for the lower South Platte River is not 35 at 2 lbs. The number should be 374 at .17 lbs. for a total pounds of fish per acre of 64.

Page 2-42, Table 2-23: The figures given for density per meter squared and for grams per meter squared do not concur with figures given in the quoted source. The table should be quoted exactly or deleted.

Page 2-43, Table 2-24: Footnote 2 should be deleted.

Page 2-45: Under the heading of Geologic Hazards and Problem Areas, the first sentence states that "Determining the ages of movement of faults in the South Platte Canyon is quite difficult since no rocks younger than Precambrian are present." After the word "Precambrian," the number (600,000,000 years) should be added to give perspective to the amount of time represented by the term "Precambrian." Additionally, the reference to the "Laramide Revolution" should also have a number attached in millions of years for reference.

Page 2-46, Paragraph 1: The term "Quaternary" is used in the first paragraph at the top of the page. This term should be identified with the number of years it represents. The sentence should read, "Quaternary fault displacements indicate the occurrence of large earthquakes in Quaternary time. Quaternary time is an occurrence within the last 3,000,000 years."

Page 2-46, Paragraph 1: The second sentence from the end of the first paragraph should be amended to include the amount of time since the "Laramide Revolution." The last sentence should be amended to read, ". . . at least intensity VII on the Modified Mercalli Scale." Other language should be deleted as confusing.

Page 2-46, Paragraph 3: The section on Faults, Joints, Seismic, and Earthquake Hazards should have an additional sentence at the end of the last paragraph of that section. The sentence should state that the Denver Water Board has consistently demonstrated concern about the existence of geologic hazards in the vicinity of its improvements and, therefore, strives to assure that every reasonable predictive and protective measure is implemented. To bring the geologic record up-to-date, the activities of the Denver Water Board subsequent to the printing of the draft Environmental Impact Statement should be documented. In addition, it should be noted that approximately 1,800 feet upstream of the proposed dam site, a series of bore holes were drilled,

two of which specifically yielded core sample evidence that the river sediment in the bottom of the Platte Canyon does not cover up any major fault or gouge zones. (See Attachment 8 et seq. for details of geologic and seismic testing.)

Page 2-56: The "current count of over 250 species" of plants implies an unusually "rich and varied flora." Homestake's Pitch Project near Monarch Pass reported 280 species of plants. Oil Shale Tract C-a in Piccanee Creek Basin reported 231 species of plants. The statement should reflect that this is not an unusual find or unusual array of flora.

Page 2-59, Paragraph 4: Detailed species lists and available information on bird species occurrence in the Waterton Canyon and NFSP River should be included, possibly as an appendix in the final statement or the source used could be identified so that interested parties could obtain such information without contacting BLM.

Page 2-60: The section entitled Bighorn Sheep is deficient and in error. The erroneous statements and assumptions contained in this section are magnified in the Bighorn Sheep discussion in chapter 3 on page 3-33 which leads to the drastic overestimate of the adverse impact on the Bighorn Sheep. For purposes of rewriting this section which begins on page 2-60, please refer to the comments on the summary page and attachments.

Map 2-7: The sources of the information for the terrestrial resources legend should be identified. How were these specific areas on the map identified?

Page 2-62: Under the section entitled Endangered Species, the first sentence should be rewritten to clarify and update. There is no real evidence that the Peregrine Falcon or the Southern Bald Eagle "inhabit the project area." By combining this language with "remote possibilities", it is impossible to tell exactly what species are in the project area. The U.S. Fish and Wildlife letter of 5 Aug. 77 should be referenced so that the public is aware of BLM's compliance with the Endangered Species Act. This will also provide the public with assurance that no endangered species or habitat will be disturbed by the proposed Foothills project. This section should be further clarified by deleting the sentence regarding the northern race of the bald eagle proposed for the endangered list. Additionally, no documented black-footed ferret sightings have been made in this area.

Page 2-66: The first paragraph under Visual Resources should be removed since it is concerned solely with Dillon Reservoir.

Map 2-8 through Map 2-11: The legends are confusing in that the reader is lead to believe that the viewing distance is subtracted from the sensitivity and divided by the scenic quality. It should be emphasized that in order to arrive at the visual management class, no mathematical formula was used. Only sensitivity, viewing distance and scenic quality were considered. The shaded areas on Map 2-11 are put in upside down. Therefore, the map as it exists is meaningless.

Page 2-71: The pictures of the scenery on Page 2-71 are both taken with snow on the ground. The effect of white snow on "form, line, color and texture" should be explained to give these photographs any crediability in this section.

Page 2-72, Paragraph 3: The last sentance in this paragraph is deceiving. It should be amended to read, ". . . low contrast values indicate that the visual impact of the proposed action will be relatively low whereas high contrast values indicate that the visual impact will be relatively high. Both of these contrast values reflect a judgment on the part of the person establishing the contrast values."

Page 2-72, Paragraph 4: The fourth paragraph should be eliminated because it is confusing and almost meaningless.

Page 2-73: Figure 2-3 is taken with snow on the ground. Figure 2-4 is taken without snow on the ground. Again, the effect of snow should be explained for these pictures to have any crediability.

Page 2-74, Paragraph 3: COMMENT: The conclusion of the paragraph is inconsistent with BLM's archaeologist's written statements to the State's Historic Preservation Officer that "further testing of the site is unwarranted." Therefore, the last sentence in the third paragraph should be eliminated.

Page 2-74, Paragraph 6: To be consistent with the archaeologist's written statement, the first sentence should be amended to read, ". . . of this project no longer warrant any further archaeological testing."

Page 2-75: Page 2-75 and 2-76 contain identical text except the last paragraph which appears on Page 2-76 does not appear on Page 2-75. Page 2-75 should be eliminated or blanked out to remedy the situation.

Page 2-80: Under the section entitled RECREATION RESOURCES, it must be noted that the value of this canyon for recreational activity is exaggerated. In addition, no mention is made of the DWB's provision and maintaining of facilities which enhance the recreational opportunities in the Canyon. Access, litter control, rest rooms, and water have all been voluntarily provided by the DWB. As stated in the draft EIS no exact number of recreational visits is available. No recreational management plan has been prepared for this area by any agency. Without planning and provision of recreational facilities or appurtenances recreational use will adversely impact this area. Without the facilities the DWB has heretofore provided a far greater deterioration of the Canyon would have been realized.

Page 2-80, Paragraph 3: The implication of this paragraph is very misleading. There are presently two major water diversion structures in the canyon. Therefore, it is not a "free-flowing river". The vegetation is of "diverse types and patterns, but is found in great abundance in all the other major canyons along the Front Range."

Page 2-81, Paragraph 2: The first sentence correctly states that, "The exact number of recreationalists visiting the canyon each year is unknown." This should be the only reference to recreational visits. All other speculation can be misleading and misused. An example of the misuse of estimates is provided by noting that in this paragraph, the statement is made "an estimated 10,000 visits were made at the canyon . . . ." This figure is then used on Page 2-102

as if it was a fact. "The estimated 10,000 annual visits that occurred." This should, of course, read, "Ten thousand annual visits that may have occurred."

Page 2-81, Paragraph 5: The first sentence should be amended to read ". . . and Cheesman Reservoir provides the best fishing on this section of the South Platte River." This will avoid the implication that the fishing and water in the canyon is comparable to the fishing in the Decker's area.

Page 2-81, Paragraph 6: The last sentence should be amended to read, "The reservoirs and segments of the South Platte separating them receives substantial recreational use in form of fishing, picnicing, camping, hiking, tubing and boating."

Page 2-84, Paragraph 7: The word "ownership" is misspelled.

Page 2-84, Paragraph 3: The word "strontia" is misspelled.

Page 2-85, Paragraph 2: At the end of the second full paragraph, the following sentence should be added, "The Forest Supervisor has stated that the proposed project is not inconsistent with the existing multiple use plan of the forest service." See our comments relative to Page 1-61, supra.

Page 2-90, Paragraph 4: The word "above" in the next to the last line is incorrect; it should be stricken and replaced with the word "under".

Page 2-91, under the heading FUTURE ENVIRONMENT WITHOUT THE PROPOSED ACTION: Testimony at the public hearing indicated that one of two alternative scenarios will develop in the future under the No Action Alternative. One of those scenarios is as stated in the Draft EIS. The other scenario would accommodate some or most of the future population growth as projected by DRCOG in a fashion similar to that which developed in the late 1950s and early 1960s as a result of so-called "blue line." The blue line was a line drawn on a metro area map outside of which the Denver Water Board did not provide service. To accommodate the population growth, special purpose districts and municipalities were created. The oral testimony indicated that such events might reoccur. The new population would be accommodated by the creation of new municipalities or special districts outside of the current urban area and either other water projects would be financed in some way (as Aurora and Colorado Springs financed the Homestake Project) or agricultural water would be condemned for use of these new political entities. It is suggested that the final environmental impact statement reflect that such a scenario is a possibility and briefly state the impacts that would be derived therefrom.

Such impacts could include scenarios where great amounts of agricultural land would be consumed by urban developments. Another ramification could be the increased amount of vehicle miles of travel generated because: (a) the development would be further from the core city; and (b) the transit service would not be economically available therefore more personal trips would be made by the automobile . . . the increased use of the automobile will of course result in an increase in automobile-related air pollution. Also, mention should be made that development of separate, smaller,

less efficient and less reliable water supply systems is much more capital intensive and as a result is not as wise an expenditure of public funds as is the proposed Foothills Project. Supplying other utility services (electricity, telephone, sewer, police, fire, schools, libraries, recreation, etc.) to such development poses similar diseconomies.

Page 2-93, Paragraph 2: Under the heading of SOCIO-ECONOMIC IMPLICATIONS, second sentence COMMENT: This statement needs clarification; it should be stated that as population within the service area increases the additional use of treated water in the winter months will be responsible for the total utilization of the annual raw water supply. In addition the nature of water-use restrictions, the time sequence in which they would be implemented and the nature of the water restrictions should be set forth to provide the reader with a greater understanding.

Page 2-93: The last paragraph states that the current average winter use rate is 117 gallons per day per capita. This figure is misleading not only because of the previous discussion concerning the utility of a per capita figure, but also ~~beause~~ because it only represents the average per capita use rate for the month of February. The definition of "winter" should be made more clear. The average winter use rate would obviously be higher since all of the other months of the winter have a higher per capita use rate than February. A conclusion that a population of 2.2 million could be served based on this average winter use rate is a total misuse of statistical evaluations. Therefore, the projected population that could be served is significantly lower than 2.2 million if, in fact, per capita figures are limiting factors.

Page 2-94, Table 2-30: The table is confusing and misleading. See discussion on page 2-5. COMMENT: It is our understanding that the shortages shown on Table 2-30 are based on a estimate of the water system's ability to deliver water at a rate of 520 mgd compared to the number of days that demand exceeds this level from the information shown in Table 1-5, page 1-18. (See our comments on Table 1-5). The analysis performed to show these shortages does not consider the cumulative effect of system operational constraints described earlier (page 2-5) upon the water system's ability to deliver treated water. These conditions can lower the system's effective capacity, resulting in a greater deficiency than shown in the shortage column of Table 2-30. The last column depicts an annual gallons per capita per day figure. See our earlier comments on the misleading use of gcd values. The net effect of not considering operational constraints and displaying only gcd values is an understatement of projected water shortages within the service area attributable to not having the proposed Foothills project on line.

Page 2-95, First paragraph: In the last sentence, the reference to Table 2-4 should be corrected in reference to Table 2-3.

Page 2-95: Additionally, the loss of horticultural investment should be indicated in this paragraph by a cross-reference to the detailed discussions elsewhere in the Statement (e.g., page 8-12) which demonstrate that the potential loss is not adequately presented by describing the NO ACTION alternative as requiring ". . . adjustment . . . in horticultural irrigation."

Page 2-100, 101: Under the heading CLIMATE AND AIR QUALITY, This Section should reference the more up-to-date air quality data compiled by EPA as part of the EPA Draft Denver Regional Environmental Impact Statement for Waste Water Facilities and A Clean Water Program.

In addition, this Section should point out that without the Project, under reduced treated water supply with the attendant loss of horticulture and return to a semi-arrid landscape, there would have to occur a marked increase in air-borne particulate matter and fugitive dust. The frequent high winds of the region plus the lack of an irrigated landscape would in all probability provide a devastating increase in the ambient concentrations of the particulate matter. It should be noted that in the most recent EPA calculations the particulate matter ambient air quality standards will be the most difficult to attain in the future. Therefore the proposed Foothills Project is the alternative most compatible with attempts to attain the particulate matter ambient air quality standards. Related to the loss of horticulture are impacts such as loss of the cooling effect provided by grass and trees which would create increased energy demand for air conditioning and the loss of erosion control which would result in increased non-point source water quality problems.

Page 2-102: Under the heading RECREATION RESOURCES, it should be pointed out that the DWB owns not only major portions of the canyon, but also both entrances to the canyon. Therefore Denver is responsible not only for the continuation of the present level of recreational activity but also for any potential increases in recreational activity in a safe and controlled environment. Without such cooperation the level of recreational activity within the canyon could have been far less than the current level.

Page 2-107: The first sentence should be rewritten for clarification.

Page 2-108: Another paragraph should be added following the first paragraph. At this point the statement should reference the possibility of the "Leap Frog Development Scenario" which would alter metropolitan land use patterns and disrupt the existing planning of the region as addressed by Mr. Donald DeDecker in his testimony on behalf of DRCOG on September 15, 1977. See also the comments on page 2-91, *supra*.

Page 2-109, Table 2-33: Under the "Future Environment. . ." Number 2 should be stricken. The relative prioritization of industry vis-a-vis municipal use pertains to the ability of a municipality to condemn water for domestic use. Thereafter, the measures taken to mitigate water shortages lie within the discretion of that governmental entity.

Page 2-111, Table 2-33: Under the heading of EXISTING ENVIRONMENT . . . "e." is incorrect. See our comments addressed to the Community Attitudes Section which appears on page 2-10. This statement should be corrected to read: "A recent survey (1977) indicates that area citizens prefer increasing water supply to institution of water restrictions by a margin of 2 to 1.

Page 2-111, Table 2-33: Under the heading, "Future Environment . . ." 8.b. states, "cut back horticulture irrigation." This is a gross understatement. A review of the statistics makes it clear that the statement should be, "near elimination of horticultural irrigation."

Page 2-113, Table 2-33: Under the heading, "Existing Environment . . ." 4.d. This statement is irrelevant to the issues at hand. No federal action has been requested which will affect the salinity levels of the Colorado River. Therefore, any reference to salinity levels in the Colorado River is confusing to the reader. This reference must be eliminated.

Page 2-117, Table 2-33: Under the heading, "Future Environment . . ." 5. This statement needs to be updated in accordance with the recent EPA work.

Page 2-118, Table 2-33: Under the heading, "Future Environment . . ." 1. This statement relative to the Waterton Canyon recreation should be revised to read as follows: "Waterton Canyon visitor pressure will depend on continued access to the Canyon and quality will depend on recreation management; . . . ."

Page 3-1, Paragraph 3: Insert the word "least" between the word "at" and "75 years." This change is necessary since the project will be operational indefinitely.

Page 3-1, Paragraph 4, second sentence: A phrase should be added at the end of the second sentence as follows: ". . . it is assumed that additional raw water supplies will be developed as needed to meet demand."

Page 3-2, First partial paragraph: The second sentence should be revised to read: "Chapter 8, Alternatives, will contain for purposes of information a general analysis of impacts related to the development and operation of various facilities required to increase the DWB raw water supplies, as estimated by the Bureau of Reclamation."

Page 3-2, Paragraph Numbered 7: The reference to Table 14 should be corrected to refer to Table 1-4.

Page 3-3, Under the heading "500 mgd development" third line down, 78 should be corrected to "28 million kwh annually."

Page 3-5: The concluding sentence of the Human Populations section should be amended to read that the conclusions used to support Assumption No. 7 include among other things the projection figures of the Denver Regional Council of Governments, an analysis of population migration into other arid areas of the world based upon other societal motives (e.g. Israel, Arizona), and a first-hand observation of the factors which have motivated people to migrate to the Denver area in recent years.

Page 3-5, Paragraph 1: The last line thereof "('Water rationing-education program', Chapter 8)." is irrelevant to this paragraph.

Page 3-5: Under the heading "Employment and Manpower": Does this section contain correct estimates? It is suggested that testimony from the public hearings be reviewed to make sure of these projections. Testimony was received concerning multipliers which operate to multiply the affects of the direct employment generated by the proposed project. This section should be modified to reflect the effect of these multipliers, thereby enhancing the beneficial effects of the project.

Page 3-6, Paragraph 4: The first sentence should be clarified to read as follows: "Expansion to the 500 mgd level will result in an additional $131,084,000 being spent by 2001 (this is an escalated figure equal to $54,680,000 in 1978 dollars), resulting in an economic impact even smaller than that of the first increment."

Page 3-8, Paragraph 1: At the top of the page the total cost of the 500 mgd project is stated to be $264,623,000. The average annual expenditure for the 10 year period should be corrected and should be stated as $26,462,300, not $2,646,230. Even if this correction is made, its significance is questionable. $133,539,000 will be spent over a three year period, and it is difficult to forecast exactly when the additional treatment plant expansions will be made. Therefore, this first paragraph is of questionable utility and probably should be stricken.

Page 3-8, Paragraph 3: This paragraph has no significance to the Income section. Therefore it should be deleted.

Page 3-8, Paragraph 4, last sentence: This needs reworking for clarification. It is suggested that the sentence read as follows: "In addition, with the availability of additional reliable raw water supplies, restrictions on use will not be necessary within the Denver Water Board service area."

Page 3-8, Paragraph 6: Since the figure 3-1 which is referenced in this paragraph is the subject of extensive comment hereinafter, this paragraph will need either revision or removal in order to respond to the comments hereinafter stated.

Page 3-9, Table 3-2: This table needs revision in order to eliminate the misinterpretation that many readers obtained and expressed at the public hearing. Since the Denver Water Board is a continuing agency responsible for delivering the service to meet the needs of the people it serves, it is unrealistic to assume that raw water will not be developed as needed. Therefore, this table should at least have added to it columns which represent projected facts assuming an unlimited raw water supply.

Page 3-10 and 3-11: Figures 3-1 and 3-2 are misleading. The graphs should be amended to show the bar graphs which indicate average percentage of raw water consumed per month. Then it should be indicated that the line graphs are really connections of the average quantities per month and the lines connecting the graphs average should be shown. The shortfall of 754 acre feet should be shown as an average not necessarily occurring at the times indicated in the graph. It should also be emphasized that the estimated shortfall is due to an assumed lack of raw water. Note: similar remarks made concerning Figures 3-1 and 3-2 on Pages 3-10 and 3-11 also apply to Figures 8-1 and 8-2 on Pages 8-7 and 8-8. In addition, the shortages shown on these figures are apparently based on information from Table 2-30 whose deficiencies were commented on earlier.

Page 3-13, Paragraph 2: Under the heading "Colorado River Watershed", the second sentence should be rephrased to provide additional clarification as follows: "Although no commitment to develop one or more of these potential sources is to be made on the basis of this environmental statement and no federal action regarding the development of these potential sources is proposed, discussion of several of these sources and their general impact are presented in Chapter 8 for general informational purposes."

Page 3-19, last paragraph: A sentence should be inserted following the second sentence as follows: "Figure shows the estimated water exchange rate within the reservoir." Attachment 4 hereto should be added as a figure in the final statement to fully demonstrate the exchange rate.

Page 3-22, under the heading "Aquatic Resources": the discussion needs some revision. The statement assumes that there would be no stocking of this reservoir. This accounts for the low biomass of game fish. This assumption should be pointed out. Another observation with regard to the last paragraph is that since this entire area receives an extreme amount of fishing pressure to the point that it is in essence a "put and take" stream, the statement should acknowledge that fact by referencing the language on page 2-33 and 2-37. Full disclosure of the degree of stocking which takes place in the subject area should be made.

John Boaze, the task force member responsible for the preparation of the aquatic resources section, testified under oath on August 11 that the reservoir would support sport fish and it would be feasible to stock the reservoir and if that were done and access to the reservoir were provided that a higher poundage of sport fish could be taken from this 1.7 miles of stream than is taken from this stretch in its current state.

Page 3-24, last paragraph: This paragraph which concludes at the top of page 3-25 provides the reader with the wrong impression. This should be rewritten to make it clear that the effect of any drawdown in Dillon on the fish population is negligible as is implied at the top of page 3-25 and as confirmed by Mr. Boaze in his testimony on August 11, 1977. Since this effect is speculative and negligible, this paragraph really should be eliminated from the final statement.

Page 3-33, under the heading "Bighorn Sheep": The entire discussion of the effects on the Bighorn sheep herd of the canyon needs revision. In short, there is no basis on which to conclude that the construction of this project will adversely affect and thus reduce the number of the herd currently in the canyon. This section must be revised in accordance with the discussion of the Summary page and Attachments.

Page 3-34, under the heading "Endangered Species": This section needs to be rewritten in accordance with the August 5, 1977 memorandum to the State Director, BLM, Denver, Colorado, from the Regional Director, Region 6 of the Fish & Wildlife Service, wherein it is concluded that the proposed project "will in no likelihood jeopardize the continued existence of the American peregrine falcon or destroy or adversely modify its critical habitat." Further, Mr. Robert Shields, Area Director of the U.S. Fish and Wildlife Service, having responsibility over this geographic area, testified that it was his conclusion that the project would have no adverse effect on the species; in addition, Mr. William White, the individual in that area office having responsibility for the endangered species program stated his concurrence in this opinion. Further, Mr. Boaze testified that it was the consensus of the group that studied the peregrine falcon issue as part of the Section 7 consultation procedure that there would be no adverse impact on the falcon by this proposed project. See Attachments 9A, B, C and D.

Page 3-34, under the heading "Southern Bald Eagle": In a deposition taken on the 15th day of August, 1977, Mr. William C. White stated that generally the Southern Bald Eagle inhabited a geographic area south of the proposed project area and further that in the discussions which took place among experts and interested parties regarding the endangered species, American Peregrine Falcon, no concern was raised and no discussion was had regarding the Southern Bald Eagle. Therefore, the final statement should be corrected in accordance with this opinion. See Attachment 9E.

Page 3-34, under the heading "Golden Eagle": Mr. Boaze testified on August 11 that his research regarding the distance of the nests from the proposed construction activity led him to conclude that there would be little impact and therefore no special mitigating measures would be necessary to protect the nesting golden eagles.

Page 3-34, under the heading "Deer and Other Big Game": The second sentence in the first paragraph therein which states "Also, illegal killing of these animals would take place." is an unsubstantiated assertion.

Page 3-36, at the end of the section entitled "CLIMATE AND AIR QUALITY" a statement regarding the compatibility of the proposal with the State Implementation Plan should be added. The record reflects that under the no action alternative either a drastic increase in windblown particulate matter will occur as a result of the loss of our horticultural investment and the return to a semi-arid landscape, or "leap frog" urban development will take place to accommodate the growth pressures which are real and here. Neither of those two scenarios are as favorably consistent with the goal to attain the ambient air quality standards for carbon monoxide, ozone, and particulate matter than is the Foothills project. It is established that there will be an increase in urban growth and the only question is how that growth will be accommodated.

The end conclusion regarding the air pollution problem within the metropolitan area which is related to automobiles is that the Foothills project is the best alternative and that any alternative to that project will have worse effects on the air quality than will the Foothills project.

Page 3-41, last paragraph: Since visual impacts are a subjective quantification, the last paragraph should be rewritten to read as follows: "One method of measuring a visual impact of a proposal on an area is to measure the proposal's relative contrast with the existing landscape. Contrast would vary with the specific elements of the proposal, the specific locations of those elements, and the existing landscape as described by physical attributes."

Page 3-42, Paragraph 1: This discussion should be greatly expanded to include a discussion and explanation of the formula used to derive the visual management classes. This discussion should include a discussion of the 4 classes, and also a discussion of the symbols used on maps 2-8 through 2-11. Such corrections will clarify the current confusing nature of the paragraph. Finally, the method for arriving at the specific numbers listed in table 3-12 and 3-13 on pages 3-43 and 3-44 should be itemized. In that regard, a detailed discussion of "sensitivity" should also occur. It should be emphasized that sensitivity in essensa is a function of the number of eyes which may see a change.

Page 3-43: Under the column entitled "Visual Management Class Maximum Contrast Limit" the number 20 should be substituted for the number 24 which appears in that column.

Page 3-44, Table 3-13: The entire chart should have a notation, a caveat if you will, to the reader which reflects the fact that any attempt to categorize the anticipated visual impacts in the year 2001 is highly speculative at best. It is dependent upon an almost unlimited number of variables.

Page 3-45: Figures 3-6 and 3-7 are misleading and confusing. Figure 3-6 can easily give the impression that high flows in the North Fork which are attributable to Roberts Tunnel diversions are causing the bank subsidence as pictured. There is no basis for this conclusion; therefore, it is suggested that this figure be removed in the final statement.

Figure 3-7 is also confusing because it is so obscured by the markings which attempt to delineate the existing river channel and flooding areas. If the object is to detect temporary flooding than actual pictures of such an event should be used along with an explanation of the cause. However, it is suggested that figures 3-6, 3-7 and 3-8 be omitted because of their basic irrelevance to this section.

Page 3-46: The first full sentence at the top of the page discusses photographic variety. This sentence should be deleted since photographic variety is not explained anywhere else in the statement.

Page 3-47, Figure 3-9: An explanation of the affect of the snow which covers the physical characteristics of the landscape in this picture should be provided.

Page 3-48, Paragraph 2: This paragraph is misleading. The paragraph attempts to explain that the impact of the

Strontia Springs Dam would generate a large visual contrast. The last sentence in that paragraph must be deleted and substituted with a sentence explaining that the Dam is only visable in the canyon for approximately two-tenths of a mile. Viewing distances of the dam crest road in the staging area should also be mentioned in their respective sections so that the short distance that these visual impacts have will be put in perspective. Substantial testimony at the public hearing demonstrates that many received the wrong impression after reading the draft statement. In reality, a visitor to the canyon will not perceive the structure for much of the length of the canyon.

Page 3-48, Paragraph 3: This description of the dam crest road is also misleading. This paragraph in combination with Figure 3-11 which appears on page 3-50 overestimates the visual impact of this road. It is suggested therefore that page 3-50 be corrected so that only the arrow be utilized to signify the point at which the proposed dam crest road traverses the mountain and a second picture of a similar road from another location be added so that the reader will have the correct impression.

Page 3-52, Figure 3-15: This figure is very deceiving in its current form. For example, the greater the distance from the viewer the more pronounced the lines appear on the picture. If the impact of the telephone poles on the canyon is to be accurately represented, it is suggested that actual photographs of telephone poles in a similar setting be provided along side of a picture of the canyon area without the benefit of the distorting impact of telephone poles and lines being placed on the photograph with heavy black drawings. Perhaps actual pictures of telephone poles such as those found on page 2-73 could be superimposed on a picture of the canyon to provide the viewer a more accurate impression.

Page 3-53, under the heading "Power and Telephone Lines": First, the impact of the power and telephone lines are greatly exaggerated. Secondly, the description is misleading. In addition to electricity and telephone service, these "lines" will provide communication, remote control, and monitoring services. See our discussion of page 4-1. It is suggested that this heading be changed to "Power, Telephone, and Remote Control Lines." Although structure and linear characteristics would represent some contrast, the contrast would not be nearly as sharp as that represented by Figure 3-15 which is incorporated into the narrative on page 3-53. Additionally, it should be mentioned that the canyon already contains power pole fixtures from the earlier period associated with the old historic railroad grade.

Page 3-53: The Final Statement should discuss the alternate routes for this utility line which have been discussed with the U. S. Forest Service by the Public Service Company. In all probability the poles will not be adjacent to the roadway.

Page 3-54, under the heading CULTURAL RESOURCES: It is suggested that this section be reviewed so that it is totally consistent with the narrative utilized in the Preliminary Case Report which is currently undergoing the Section 106/2b review. For example, on page 3-55, paragraph 8 it should be pointed out that at such time as flows within the North Fork reach a magnitude which necessitates bank improvement, that a Corp of Engineer Section 404 Permit will be required.

Page 3-55: With regard to Paragraph 9, it is suggested that this paragraph be moved so that it precedes the ninth paragraph on page 3-56 to enable the reader to have a clear understanding. In that regard, this narrative should point out that since the impacts on the North Fork will occur at a distant point in time, they are as a result hard to quantify at this point in time; therefore, the 106/2b review relative to the North Fork area will accompany the future Corps of Engineers review referenced above.

Page 3-56: 6th Paragraph--Site Number FH-017. Pavillions. The channel of the North Fork of the Platte River has been channelized past this site; therefore, no future damage due to increased flows is anticipated.

Page 3-56: The section entitled RECREATION RESOURCES has a very negative tone. Despite their unnaturalness, Chatfield Reservoir and Cherry Creek Reservoir provide over 1.5 million visitor days per year of recreation in the Metro area. The NFSP even with channelization provides many recreational days. Ten Mile Creek's completely manmade channel is also projected to provide large numbers of visitor days. It seems improper to so negatively describe the recreational impacts associated with this project. It is suggested that this section be revised in the Final Statement to provide more objective treatment.

Page 3-57: The reference to the Bighorn sheep in the first full paragraph needs to be corrected in accordance with the discussion of the Summary page and Attachments. It is suggested that the second sentence end after the word "decreased".

Page 3-57, Paragraph 3: The third paragraph should be rewritten to exclude the erroneous conclusions regarding the effect of the proposed project on the Bighorn sheep in accordance the discussion of the Summary page and Attachments.

It is suggested that the words "especially Bighorn sheep and eagles . . ." be removed from the first sentence and that the last sentence be stricken.

Page 3-57, Last Paragraph: This paragraph assumes no stocking program for sport fish would be undertaken and this assumption must be noted. It is suggested that this paragraph be revised to reflect the statements of Mr. John Boeze, team member for the U.S. Fish and Wildlife Service, wherein he stated that the reservoir could be managed to control non-game fish while providing good sport fishing opportunities. See Attachments 11B.

Page 3-58, Paragraph 1: The first sentence should be corrected to reflect that only a portion of the canyon would be utilized by the reservoir and from the remainder of the canyon the dam could not be viewed.

Page 3-63, under the heading "Impact of 125 mgd," paragraph numbered 1: Between the word "for" and the figure "75" the words "at least" should be inserted.

Page 3-63, under the heading "Impact of 500 mgd," paragraph numbered 4.a.: The word "conservation" should be replaced by the word "restrictions".

Page 3-65: The "b." subparagraph under the "Water Resources" Environmental Element should be stricken since under subparagraph "a." it is noted that the impacts of the

500 mgd are presented in Chapter 8. In addition, this reference to salinity is not only irrelevant but also confusing to the reader.

Page 3-65, under the heading "Impact of 125 mgd," paragraph numbered 3: A phrase should be added at the end of this sentence as follows: ". . . unless a stocking program is initiated."

Page 3-68, under the heading "Impact of 125 mgd," paragraph numbered 2.a.: The reference to the Bighorn sheep should be corrected in accordance with the discussion of the Summary page. It is suggested that this subparagraph be stricken.

Page 3-68, under the heading "Impact of 125 mgd," paragraph numbered 2.b.: This reference to impact on endangered species needs to be corrected in accordance with the new information available, referenced hereinabove. It is suggested that this paragraph read as follows:

> "Peregrine falcon. No adverse impact on this species is expected."

Page 3-68, under the heading "Impact of 125 mgd," paragraph numbered 2.c.: This paragraph overestimates the negative impacts. The statement regarding the golden eagle eyrie is not substantiated in the text. Conjecture in the text is transformed to absolute statements in this table. In addition, the word "birds" is misspelled. It is suggested that this paragraph be rewritten to read as follows:

> "It is possible that the construction may have some effect on one golden eagle eyrie. Deer, mountain lion, and bear may be disturbed and may possibly leave the canyon during the construction period. Raptors and other birds may be harmed by the possibility of their flying into the power lines."

Page 3-69, under the heading "Impact of 125 mgd," and under the heading "Impact of 500 mgd": New numbered paragraphs -- 3. -- should be added under the "Environmental Element" of "Climate and Air Quality" which state as follows:

> "The proposal is consistent with the EPA approved State Implementation Plan."

Page 3-70, under the heading "Impact of 125 mgd," paragraph numbered 6: The impact from power and telephone lines is overstated. It is suggested that the impact be rephrased as follows:

> Power and Telephone Lines:
>
> "noticeable linear impacts."

Page 3-70, under the heading "Impact of 125 mgd," under the "Environmental Element" of "Archaeological Resources": This impact is overstated. It is suggested that this paragraph be rewritten to coincide more with the text. Preferably, this table could reference the section in which this is discussed.

Page 3-71, under the heading "Impact of 125 mgd," paragraphs numbered 1 and 3: These paragraphs need to be corrected, especially as they relate to Bighorn sheep. It is suggested that they be rewritten as follows:

> "1. Vegetation removal would affect wildlife.
>
> 3. Construction noise and activity could drive animals away."

Page 3-71, under the heading "Impact of 125 mgd," paragraph numbered 6: This assertion assumes that the reservoir will not be managed for fishing and that it will not be stocked. It is suggested that it be rephrased as follows:

> "Management of the reservoir will determine its fishing quality."

Page 3-71, under the heading "Impact of 125 mgd," paragraph numbered 7: There is no substantiation in the text for inferring that recreation attendant to reservoirs has

more littering than that attendant to rushing streams. It is suggested that this be rephrased as follows:

> "Recreation would change from a stream to a reservoir within a section of the canyon."

Page 3-71, under the heading "Impact of 125 mgd," paragraph numbered 8: The first sentence is a subjective observation and should be corrected. It is suggested that it be changed as follows:

> "Access road could decrease wildlife habitat and will change the aesthetic appearance."

Page 4-1, Mitigating Measures: As stated at the public hearing by Mr. Brannan, President of the Board of Water Commissioners (DWB), the DWB is totally committed to building an environmentally sound and compatible project and will, on its own motion, adopt all reasonable mitigating measures that will help in obtaining that goal. It should be pointed out, however, that the BLM, the U.S. Forest Service and Corps of Engineers have questionable legal authority to impose so-called mitigating measures which relate to the treatment plant complex, that work which will occur on non-federal lands and that work which does not involve the jurisdiction of section 404 of the Federal Water Pollution Control Act.

The twenty listed mitigating measures fall into four basic categories.

The first category involves those areas of environmental concern which are readily recognizable and are those to which the DWB also has a concern for assuring the utilization of best management practices and adequate reclamation and restoration. Mitigating measures numbered 1, 2, 3, 4, 5, 6, 9, 10, 13, 14, 15 and 16 fall within this category. Although the DWB, as the applicant, and the various governmental agencies may not at this time be in complete accord

with regard to specific mutually-agreeable language, it certainly can be said that these are areas upon which the DWB hopes agreement can be reached.

Secondly, mitigating measures numbered 11 and 12 relate to compliance with the National Historic Preservation Act and, since there is underway a Section 106/2b procedure, our comments will be reserved for input within that context.

The third group concerns the power and telephone lines, these mitigating measures are numbered 17, 18, 19 and 20. Our position with regard to those four mitigating measures as set forth within this section are similar if not identical to the position taken with regard to the first group of mitigating measures mentioned hereinabove. The reason for separating these from that first category relates to our knowledge of the apparent ongoing policy of the Supervisor of the Pike and San Isabel National Forest, which is to require the burial of telephone lines and electric transmission lines which carry under 32kv. This issue is presented as a minor alternative in Chapter 8, (see page 8-28). It is suggested that this issue be identified as a possible mitigating measure because of this U. S. Forest Service Policy. The final statement must then discuss this proposal in greater detail to emphasis how absurd such a proposal is by pointing out the outlandish costs involved in burying those lines as against the relatively insignificant costs of stringing them on environmentally compatible poles, as suggested in the current mitigating measures section.

The final statement must document that placing power and telephone lines underground raises a number of practical concerns. The Strontia Springs Dam, due to its remote location and required operational patterns, must be controlled remotely. The control and monitoring circuits involve reservoir elevation, outlet valves, dam water elevation, standby power, river flow, and security. This dam will serve as the control point for a majority of the water serving the whole Denver service area. The above control and monitoring functions are critical to operation. Cost and maintainability must be considered where the power, communication, and control lines are addressed.

It will be impossible to bury the instrumentation cable in the same trench with the power cable. Mountain Bell has established a maximum power load of 8.6 amperes in relation to inductive noise interference. See Attachment 10. The length of the line and power loads of 300 amperes at the dam and construction loads which are greatly in excess of those permitted make it impossible to put these lines in the same trench. This will necessitate the excavation of 2 separate trenches, proper bedding laid down, conductors placed, and then careful backfilling and compaction.

Because of the priority of the instrumentation and control circuits it is imperative that they be accessable and easily maintained. It has been the Water Department's experience that this is not the case with the conventional buried telephone cable. If trouble should develop, it is difficult to repair the line rapidly because excavation is required. Due to the remote location and the terrain involved, this would be most difficult. It should also be pointed out that the exact location of a fault in a buried cable is sometimes difficult to pinpoint.

The cost difference between overhead and underground installation is significant. The Public Service Company estimated the following costs:

UNDERGROUND:

1.	Excavation, ducts, splicing boxes, trenches, backfill, manholes	$417,978
2.	Installation costs	$ 74,512
3.	Temporary equipment and installation	$ 16,074
		$508,564

ABOVE GROUND:

1. Poles, installation and materials $107,091

Mountain Bell's initial lump sum cost estimate for furnishing and burying underground armored cable is $153,000. However, this does not take into account extensive excavation in rock. Based on knowledge of the terrain and current excavation costs, we believe that a 30% ($50,000) contingency must be added for a total of $203,000. If all lines are above ground, this effectively eliminates this extra cost.

The total cost ratio for placing all lines underground as compared to above ground is approximately 7 to 1 ... very significant.

The fourth category of mitigating measures are so outrageously unreasonable in the form in which they are presented that it requires special identification and attention.

Mitigating measure No. 7 on page 4-3 indicates that the BLM plans to require Denver to bypass certain flows of water at the Strontia Springs Dam Site. The stated reason for this requirement appears to be for the purpose of compensatting for the conversion of 1.7 miles of free-flowing stream to reservoir use.

Nothing appears in the Draft Statement to explain whether the Strontia Springs stream flow bypass stipulations agreed upon by the United States Fish and Wildlife Service and Denver in 1967 (Attachment 11A) have become obsolete by reason of any changes in the natural conditions on the stream. Since there is no difference in those conditions, the original fishery stipulations are still valid.

Neither does it appear why the "mitigating measure" described in the Draft Statement varies from the version recommended made by U.S. the Fish and Wildlife Service in 1977. That recommendation, made by Mr. John Boaze, the team

member for the U.S. Fish and Wildlife Service, had included a limitation that the amount of water to be bypassed would be limited by the rate of flow set forth or the "natural inflow, which ever was less". The "natural inflow" language which had been an essential element of the 1967 stipulations, had been stricken by the team leader because the hydrologist on the team had indicated it would be impossible to determine what the natural stream flow would be (See Boaze deposition, Attachment 11B, pps. 83, 86).

Such an action is arbitrary and capricious. It ignores the existence of the South Platte stream guage located on the South Platte River a short distance upstream from the Strontia Springs Dam site. There is relatively little native tributary inflow to the river between those points so that the measured flow occurring at the South Platte Station is essentially the inflow at Strontia Springs. Moreover, the portion of that measured flow which occurs naturally can easily be derived by subtracting from the amount measured, the amounts of the various flows which are attributable to upstream reservoir releases or transmountain and nontributary deliveries into the stream system. That simple arithmetic procedure, coupled with an equally simple bookkeeping technique are used on a daily basis by the State Engineer in the administration of the flow of the South Platte River. The final statement should recognize these facts and restore the natural flow concept in the treatment and description of fish flow bypass stipulations.

Another display of an arbitrary and unreasonable change from the 1967 bypass Stipulations is the requirement that the flow of water to be bypassed be measured, not at the Strontia Springs Dam, but at the Waterton gauge, some 6 miles downstream from the dam. How outrageously unreasonable

such a requirement would be becomes obvious when it is understood that its imposition would force Denver to forego the diversion of as much as 9700 acre feet of water per year on some of the most senior Platte River water rights it owns. 9700 acre feet of water can supply 49,000 people with municipal water service and is worth, at present market value, fourteen and one-half million dollars.

By extrapolation from correct fish population estimates found in the 1974 Environmental Assessment but erroneously reported at page 2-39 of the Draft, it would appear that 8.86 acres of free flowing stream would be inundated by the creation of the 1.7 mile long reservoir. That portion of the stream was estimated in 1974 to have the equivalent of 64 pounds of fish per acre, resulting in a total of 567.04 pounds of fish in the 1.7 mile stretch of river. To illustrate how absurdly unreasonable the imposition of this "mitigating measure" upon the people of the City of Denver would be one might measure the number of pounds of fish presumably lost by the inundation of 1.7 miles of reservoir by the value to the people of the City of Denver of the water rights lost to maintain the required bypass. The result reveals that the people of Denver would be buying the equivalent of 567.04 pounds of fish for $14,500,000 which works out at a $25,571.39 per pound. This illustration merely emphasizes how unthinkably impossible it would be for the lawfully appointed representatives of the people of Denver to accept such an unreasonable condition on the operation of the Foothills Project, particularly when there is no evidence in the Draft Statement nor in the statements of those who worked on this section, to indicate that there is any justification to change from the stipulation agreed upon by the U.S. Fish and Wildlife Service in 1967.

Moreover, the Board of Water Commissioners may not lawfully waste such vast quantities of water which were appropriated for use by people in the Denver Metropolitan Area; its powers are limited by Charter and serious doubt exists as to whether it may lawfully agree to accept the imposition of such a restrictive and wasteful "mitigating measure" as is proposed. (Attachment 11C).

Denver is not proscribed by those legal inhibitions however, from accepting reasonable stream flow bypass conditions along the lines of the already agreed upon 1967 Stipulation. Attachment hereto is a proposed clarifying revision of the 1967 Stipulation which is designed to fit the concept of winter and summer flow protection suggested in the current draft statement. Such an approach, it is believed, could lawfully be accepted by the Denver Board of Water Commissioners, not in mitigation for the loss of 1.7 miles of free flowing stream but in the preservation of existing fishery values in the canyon area.

In fact, the need to mitigate a loss would be totally obviated by the U.S. Fish and Wildlife Service and the Colorado Division of Wildlife undertaking an appropriate program for the stocking of the Strontia Springs Reservoir with predator fish (Brown Trout) which could serve the duel purpose of controlling an increase in the non-sport fish population thought to be a natural result of converting a free flowing stream to a reservoir while at the same time providing good, catchable sport fish. But apparently such a stocking program was not thought to be desirable by either the U.S. Fish and Wildlife Service or the Colorado Division of Wildlife. It is inconceivable that Denver should be required to lose $14,500,000 through the waste of water appropriated for people to use when the other public agencies

having appropriate responsibility over fisheries and who have an active stocking program in river upstream of the canyon fail and neglect to perform their public duty in the management of a resource Denver would create by the construction of the Strontia Springs Dam. That such a fish stocking and management program would be effective, is also demonstrated by the comments of Mr. John Boaze in his deposition (Attachment 11B, pps. 46 - 53).

But the authors of the draft statement are not content with the use of $14,500,000 worth of Denver's water to compensate for the loss of a fishery estimated to weigh 567 pounds; the statement goes on in paragraph number 8 on page 4-3 to require that additional compensation be provided in the matter of developing stream improvements in a section of a stream which has been described in the Draft Statement as being a poor fishery to start with. No estimate of the cost of the proposed stream improvement program was made nor was there even a determination as to whether such a program would be feasible in view of the high flows of water which can normally be expected to be encountered in the stretch of the stream for which the program appears designed. The spillway capacity for the Strontia Springs Dam is designed to accommodate a flood flow of 90,000 cubic feet per second, while the outlet facilities are designed to pass a flow of 4,000 cubic feet per second. Competent engineering evaluation of the effect of flows in the range from 3,000-4,000 cubic feet per second on the proposed stream improvement structures reveals that very few if any of them can reasonably be expected to withstand such flows and maintain their structural integrity; any great flow could be expected to assure their destruction. See also statement of C. N. Feast (Attachment 11B).

The Final Statement should take these matters into account and not propose to impose a recurring obligation on

Denver to construct and reconstruct structures which are certain to be destroyed by natural flows when the purpose of such structures is to improve a poor fishery which would not be made worse by the operation of the project.

Page 5-1, Paragraph 3: The first sentence should be revised and expanded in accordance with oral testimony at the public hearing which correctly pointed out that the nature of construction work is that once a particular project is completed or a particular worker's segment of a project is completed that worker thorugh the construction worker hiring process moves to another project. Therefore, it is not correct to cite the layoff of 460 construction workers at the end of the project as an unavoidable adverse impact.

Page 5-2, WATER RESOURCES: References to the Colorado River Basin need to be revised. The first paragraph in the "Water Qualty" Section, the first sentence correctly points out that these diversions will occur, notwithstanding the Foothills Project. Therefore, it is incorrect to cite the incareses in salinity, etc. in the Chapter 5 because it infers that effects on the Colorado River Basin which cannot be avoided are realted to the Foothills Project.

Page 5-5, Paragraph 3: The conclusion of this paragraph is an overestimate of the adverse effect. Of the 108 acres of vegetation that will be permanently lost, 95 of the acres would be under water in the reservoir take zone. Since the reservoir is projected to be of high quality and since there will be a significant reduction in the sediment load of the water passing through the dam, it seem to be a drastic overstatement to state that the additional 13 acres of vegetation permanently lost out of the thousands of acres

in the Canyon "would significantly effect terrestrial habitats, sediment yields, and water quality."

Page 5-5, Paragraph 4 which continues on page 5-7 should be revised to reflect that the 25-acre loss of riparian habitat referred to in this paragraph may be excessive and if it does occur in that magnitude, it would occur over many, many years. Therefore, the establishment of riparian habitat around the shoreline of the reservoir would, over these same years, actually amount to a net increase in riparian habitat.

Page 5-7, first full paragraph, (paragraph 1): Speculation and possibilities of impacts described elsewhere in the texts are transformed into certeinties in Chapter 5. For exmaple, it has not been established that there will be illegal killings of wildlife. It would be more correct to replace the first sentence with the following: "Adverse impacts on wildlife species in the project area will vary."

Page 5-7, Paragraph 2: This paragraph regarding the adverse impacts on the Bighorn sheep population must be revised in accordance with our discussion of the Summary page.

Page 5-7, Paragraph 3: This paragraph should be stricken. Such impact on the North Fork is not quantifying and is not part of this process, rather it relates to future Corps of Engineers actions. Secondly, with regard to any impact on the American peregrine falcon, there is no adverse impact. See our discussion of page 3-34.

Page 5-7, Paragraph 4: We suggest that this paragraph be combined with paragraph 1.

Page 5-9: At the beginning of the section outlined "VISUAL RESOURCES: it should be pointed out that documentation or quantification of visual impact is subjective and is a function of distance from the impact and the object. The significance of impact as a function of distance applies to all such visual impacts and makes them impossible to quantify in other than general subjective terms. See our discussion of paragraph 2, page 5-10.

Page 5-9: The last partial paragraph which concludes on page 5-10 and the first full paragraph on page 5-10 should be eliminated from the text because it is stated elsewhere that the draw down of Dillon can occur notwithstanding the proposed Foothills Project. Its inclusion in Chapter 5 provides the confusing impression that it is in some way related to the project.

Page 5-10: Under the heading "Strontia Springs Dam" the first paragraph should be rewritten to call attention to the reader that the Dam only becomes a dominate feature in the Canyon in that portion of the Canyon in which it is visible, estimated to be approximately 2/10's of one mile. Since the Dam is visible from only a portion of Waterton Canyon, an inference that it dominates the entirety of the Canyon should be removed.

Secondly, this sub-section should point out that since quantification of visual impact is subjective, some individuals obtain pleasure by viewing the existence of a dam within a canyon. As a result, to some members of the public the change will be most positive.

Page 5-11: The discussion under the heading "Dam Crest Road", the discussion again overestimates the visual impact. See our discussion of page 3-48.

Page 5-12, Paragraph 2: The reference to Table 5-4 is incorrect since the staging area is not treated in Table 5-4.

Page 5-12, Paragraph 3: It is suggested that the heading of this paragraph and its contents be revised according to our discussion of page 3-53. In addition, Table 5-5 is incorrectly referenced in this paragraph since this subject matter is not treated in that table.

Page 5-12, last paragraph: This paragraph dramatically portrays the futility of documenting visual impacts.

Page 5-14, Paragraph 4: There is no basis within the text for the statement that there will be ". . . extensive impact on archeological resources." This subsection should be corrected in accordance with the Preliminary Case Report which has been prepared in connection with 106/2b procedure.

Page 5-14, Paragraph 4, fourth sentence: The word "south" should be replaced by the word "north."

Page 5-16, under the heading RECREATION: The first paragraph needs revision. Elsewhere in the text there is reference to the loss of recreational days as a result of closure of a portion of the canyon during the construction period. Also pointed out in the text is the fact that wildlife will return to the canyon following the construction period. At such time as the canyon is once again opened up for recreation (after construction), the wildlife will begin returning to the canyon. Therefore, the decrease in recreational experience addressed in this paragraph, if any decrease occurs at all, will be slight and unquantifiable. Also, the singling out of the Bighorn sheep within this paragraph must be eliminated. See our discussion of the Bighorn sheep on the Summary page.

Page 5-16, last paragraph: This paragraph has an unstated assumption that those agencies responsible for providing fishing opportunities will not carry out their responsibilities by stocking the reservoir. This assumption should be stated. Further, see our discussion of page 4-1, mitigating measure 7.

Page 5-17, Paragraph 2: The impacts described herein as a result related supposedly with construction at the treatment plant area are grossly exaggerated. These assertions are unsubstantiated and no studies are cited which could be used to extrapolate these impacts from the construction of the proposed project.

Page 5-17, Paragraph 3: This paragraph should be removed since it is stated elsewhere in the text that the drawdown of Dillon reservoir will occur periodically notwithstanding the Foothills project. Placement of this paragraph in Chapter 5 confuses the reader into imagining a false connection.

Page 5-19, Table 5-6, SUMMARY TABLE OF ADVERSE IMPACTS WHICH CANNOT BE AVOIDED: This table is the most biased summarization effort in the Draft Environmental Statement! It dramatically demonstrates the bias of either the author or the editor. Possibilities are transformed into certainties, temporary disturbance of land is transformed into permanent loss, subjective opinions are transformed into fact, and inflamatory adjectives are used to distort an impact. The same impact is listed in two or three different

places without any cross-referencing so that the reader is not made aware that the same impact is being counted two or three times under different headings. Perhaps the most blatant distortions involve those impacts listed in this table which are not adverse at all, or constitute only a change in form, or which may be adverse from a subjective point of view. This kind of distortion must be guarded against vigorously since many readers of impact statements view only the summary tables because of the limited time available to them. Such a biased, slanted portrayal of facts leaves a distorted impression. That is why summary tables must be prepared with extra care and diligence to assure their accuracy and objectivity.

This table must be rewritten in its entirety. Even though each item needs revision in some way, in the interest of time only the more blatant errors will be mentioned hereinafter.

Page 5-19, paragraph number 2., "Employment and Manpower:" This should be corrected in accordance with our comments regarding page 5-1.

Page 5-19, paragraphs numbered 1.b. and 1.c. are examples of impacts which are not necessarily adverse but are merely changes.

Page 5-19, paragraph numbered 2.a. and 2.b. under the "Water Quality" heading, should be stricken. See our comments regarding this subject matter on page 5-2.

Page 5-20, paragraph numbered 1., under the "Environmental Elements of Aquatic Resources," "Impacts at 500 mgd," needs revision to demonstrate the time period over which this possible impact may occur. Use of the word "destroy" is an example of inflammatory description of a questionable impact.

Page 5-21, under "Geogology, Minerals, and Topography," paragraph numbered 2. should be changed as follows: The number "6000" should be corrected to read "6002."

Page 5-21, under "Geology, Minerals, and Topography," paragraphs numbered 3. and 4. are insignificant impacts; they should not be in a table of this nature.

Page 5-21, under "Geology, Minerals, and Topography," paragraph numbered 5. is not stated as an adverse effect elsewhere in the text, it will serve to revitalize downstream fishery habitat.

Page 5-21, under "Geology, Minerals, and Topography," paragraph numbered 6.: A use of a resource can hardly be termed adverse. This more properly belongs in Chapter 7, IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES.

Page 5-21, under "Terrestrial Resources," paragraph numbered 1. should be corrected in accordance with our comments regarding page 5-5.

Page 5-21, under "Terrestrial Resources," paragraph numbered 2. contains unsubstantiated and biased language and should be corrected in accordance with our comments regarding page 5-7.

Page 5-22, under "Terrestrial Resources," paragraphs numbered a., b., and c. should be corrected in accordance with our comments regarding page 5-7.

Page 5-24, under "Visual Resources," paragraph numbered 4. is not necesarily an adverse impact.

Page 5-24, under "Visual Resources," paragraph numbered 8. contains an overstatement of an adverse impact. See our comments regarding page 5-12.

Page 5-25, under "Paleontalogical Resources," in both columns the word "would" should be changed to "could."

Page 5-25, under "Recreation," paragraph numbered 3. should be corrected to read: "The remains of the railroad bed for DSP & PPR would be lost."

Page 5-25, under "Recreation," paragraph numbered 4. describes an impact which is not necessarily adverse.

Page 5-25, under "Recreation," paragraph numbered 5. indicates an increase in visitors, therefore an increase in recreation, that is a benefit not an adverse impact. Again, there is no documentation regarding an increase in litter.

Page 5-25, under "Recreation," paragraph numbered 6., the word "some" should be inserted between the words "for" and "recreationists."

Page 5-25, under "Recreation," paragraph numbered 7. is not substantiated in the text, and should be stricken.

Page 5-25, under "Recreation," paragraph numbered 8. should be stricken. See our discussion regarding page 5-17.

Page 5-26, under "Land Use," column entitled "Impacts at 500 mgd," paragraph numbered 1 describes an impact which is not necessarily adverse but merely a change of use.

Page 5-26, under the column entitled "Impacts at 125 mgd," paragraph numbered 2, this statement is incorrect. Nine acres which will be utilized by roads and eight acres which will be disturbed but will be restored have been combined into the assertion that roads would occupy seventeen acres. Again a change which is not necessarily adverse.

Page 6-2, Paragraph 1: The reference in the sixth and seventh line to the loss of 35 head of Bighorn sheep should be deleted in accordance with our discussion of the Summary page.

Page 6-2, Paragraph 2: The third sentence seems to overestimate the relative rugged nature of the project area in light of the fact that diversion dams exist and government vehicles often traverse the area.

Page 6-2, Paragraph 3: On the third line, the word "below" should be replaced with the word "above".

Page 6-3, Paragraph 3: In the fourth line, the number "78" should be replaced with the number "28" and in the eighth line the number "128.6" needs recomputation as the result of the aforementioned typographical correction.

Page 7-1, Last Paragraph: The reference to the loss of 35 Bighorn sheep needs to be deleted in accordance with our discussion on the Summary page.

Page 7-1, Last Paragraph: The third sentence should be deleted in accordance with our discussion of the American peregrin falcon relative to page 3-34.

Page 7-3, Last Sentence: It is suggested that the figure "$131,084,000" be explained by inserting a parenthetical expression following the figure as follows:

> "$54,680,000 in 1978 (compounded with an escalation factor of 8%)".

Page 8-1: Under the heading ALTERNATIVES TO THE PROPOSED ACTION, it is pointed out that other alternatives were considered and rejected because they were not technically feasible or they would result in unacceptable environmental impacts. It should be noted that it is the position of the Denver Board of Water Commissioners that a reasonable selection of feasible alternatives have been addressed and that suggestions at the public hearing that other alternatives need exploration are without merit and should be cast aside. In fact, the environmental statement especially with regard to the informational discussion of raw water alternatives concepts, goes beyond the legal mandates of the National Environmental Policy Act.

With regard to paragraph 4, if the discussion of the so-called raw water alternative concepts is to appear in the final statement, notwithstanding the lack of a legal mandate for it to so appear, it is suggested that the fourth paragraph be revised to read as follows:

> "In addition, an analysis is presented on alternatives for potential raw water sources as formulated by the Bureau of Reclamation for inclusion in this statement for informational purposes. They are as a result not discussed elsewhere in the statement. These are not part of the proposed Foothills project, they are not presented as proposed federal actions, they are not eminent and have note been submitted for any federal approval, and this environmental impact statement will not commit the federal government to any support for any of the enumerated concepts. It was, however, thought appropriate that this discussion be included for informational purposes, because existing reliable developed water resources of the DWB will be fully utilized during the life of the project."

Page 8-1: Major Alternatives: The discussion under the No Action alternative is totally unsatisfactory. A program designed to compel the residential water user to reduce his demand for water service to a point where his investment in landscaping amenities has been destroyed is seen by the draft statement (pages 8-11 through 8-14) as an inevitable result of the No action Alternative.

Such a program is also seen by the project opponents as a panacea which would solve all of the environmental and social problems of the Denver metropolitan area. They argue that such a program, variously described as the "conservation" alternative, would make the Denver area such an intolerably unpleasant place in which to live that the current rate of inmigration into the region would be reduced to the point where additional filtration facilities and new raw water supplies become unnecessary.

The draft statement rightly presupposes that such a demand-reducing program would have no effect upon the rate of inmigration, but fails to demonstrate for the benefit of the decisionmaker how totally ineffective such a device is in the control of population growth. The BLM social scientist, Dr. George Douglas, who worked on the socio-economic aspects of the draft statement, expressed the correct conclusion concerning the relationship between the adequacy of

water supply and population growth from inmigration in a recent deposition when he pointed out that there is no demonstrable evidence to show that lack of water has had a measurable influence on reducing inmigration in various societies and cultures; he cited as outstanding examples of the proof of this fact the cities of Los Angeles, Tucson, Phoenix and the State of Israel. (See Attachment 12A, a portion of the deposition of George Douglas, August 25, 1977.) His conclusions are borne out by the actual experience of others and should be more clearly enunciated in the final statement as, not just an assumption on which the final statement is based, but a sound basic premise supported by irreputable scientific analysis.

Accordingly the final statement should emphasize the validity of that premise in describing how intolerable the No Action Alterative will become in the face of the planned, orderly population growth the Foothills plant is designed to serve, a growth which federal energy policies are certain to stimulate. In that description, the final statement should take into account and report the very able description by Mr. Herb Gundel on the horticultural disaster which the No Action Alternative would be certain to cause if the planned for growth continued to be dependent on Denver for water service and Denver were denied the means with which to meet that growth. Mr. Gundel's credentials in the field are unmatched anywhere, and his analysis of the condition should be given special weight. (See Attachment 12B for description of his professional background.) The likelihood of a better condition occurring if the growth were served from other sources is not certain and should be noted.

At the heart of the arguments favoring the compulsory demand reduction program as an alternative to the project is the basic assumption, not proven by fact, that water use

practices in the Denver metropolitan area are wasteful and that if only they could be corrected, the need for Foothills would vanish. Such arguments belie the fact. Denver requires that water not be wasted and that water conservation devices be used. The rules and regulations governing water use promulgated by the Denver Water Board provide:

> 12.01 Beneficial Use. Water shall be used only for beneficial purposes and shall never be wasted. Water for irrigation of lawns shall be used only pursuant to regulations of the Water Department. * * *
>
> 12.031 Cooling-Industrial, Heating, Processing Systems. A water conservation device conforming to specifications as required by the Engineering Division shall be installed on the following water facilities when using water originating in the water system:
>
> a) All industrial heating processing facilities.
> b) All evaporative cooling or airconditioning facilities which allow unevaporated water to drain away.
> c) All refrigerated cooling or airconditioning facilities which have a capacity of more than five tons refrigeration. * * *
>
> 12.04 Water Conservation Devices. A water conservation device is any contrivance whereby at least 90% of the water used for cooling, heating or manufacturing purposes is reclaimed for reuse for the same purpose and will enable the water so reclaimed to be likewise reused and further reclaimed. Without limiting the generality of this definition, specific examples of such devices include evaporative condensers, spray condensers, cooling towers and spray ponds.

Again, it is attempted to show that the projected per capita water use on the Denver system is excessive and wasteful by comparison with other cities' use. The comparisons which are made are seldom appropriate. For instance, the per capita use of water in Boulder, a bedroom community with essentially no industry, is no measure against which to compare such use in Denver with its high concentration of industrial and commercial users.

The draft statement, along with various opponents of the Foothills project, makes the erroneous assumption that

universal metering will, in and of itself cause a reduction in per capita demand. (See earlier comments on the utility of this value).

In doing so, it also incorrectly states that 54.3% of the Denver customers are unmetered; this information is obsolete. The fact is, that as of 1977 only 42% of the Denver customers were unmetered. The final statement should be corrected to show the correct percentage.

Unmentioned in the draft statement is the fact that achieving universal metering is estimated to cost between $20 and $30 million. The final statement should show this expense and describe why it is not now known whether such a program would be truly cost effective.

Indeed Denver has been studying the value of universal metering for over 20 years with the best consultants it could find. Those studies were performed as follows:

1. 1955--Alvord, Burdick and Howson Report on Future Water Supply, and the Effect of Universal Metering.
2. 1961--Johns Hopkins University Study on the Difference Between Metered and Flat Rate Usage.
3. 1973--William Green--Feasibility Study, Benefits v. Cost of Universal Metering.
4. 1973--Robert Carley, Wastewater Reuse, Metering, Restrictions--Public Opinion Poll.
5. 1974--J. E. Flack, A Report on the Evaluation of Universal Metering in Denver, Colorado.
6. 1973--Samuel Bryson, Water Metering Experiments for Flat Rate Denver Residences.

The Alvord, Burdick and Howson Report evaluated the results of universal metering in other cities, but concluded that it could not positively recommend a universal program on a cost effective basis in 1955. (Attachment 12C) Nevertheless, and in response to that firm's report, Denver did commence, in 1957, to require that all new customers be metered with a result that as of now the number of those who are unmetered has declined to 42% of the total.

The 1973 study by Dr. Ernest J. Flack of the University of Colorado also concluded that "Even the most intensive analysis of the available data, does not permit us to make a recommendation for universal metering. More information based on research is needed before a decision, one way or the other, can be made." (pps. 4 & 5, Attachment 12D)

Fleck and Bryson recommended the development of a carefully planned, scientific study of the water use within the Denver system in order to determine with more certainty, the actual extent of water saving which would be realistically possible in order to find out whether such a program would be cost effective.

The Bryson study, a five-step, seven-year program expected to cost $332,000 was initiated in 1973. The first two steps have been completed, but the remaining three, the most expensive, have not been initiated for lack of funds. The program, originally expected to be completed by 1980 will be delayed further unless federal funds can be secured for its completion. But even before the completion of such a study and that assuming the realization of the most optimistic savings which might result from a universal metering program, the maximum day use projected for the Denver water system would be still above the treatment plant capacity for 1977. The Denver Water Board urges the BLM to assist in the search for Federal funds to the end that the program can be completed in a reasonable time so that a scientific evaluation of a universal metering program for Denver can become the basis for decision-making, rather than the currently emotional rhetoric of the project opponents, none of whom have any expertise or experience in the utility field.

Until the completion of that study program, federal action compelling the institution of a universal metering program, even if lawful, which is very doubtful, would be premature and unwarranted. It was for that reason, and because of legal constraints on Denver's right to issue bonds, that a recent, highly publicized federal loan-grant scheme designed to force metering was declined by Denver. That scheme, rather than being a grant of $4 million as reported in the press would have had the Economic Development Administration of the federal government purchase $3,200,000 worth of Denver water bonds and grant Denver $800,000 upon condition that Denver use the money for a universal metering program.

The 1973 Bond Ordinance under which Denver has current authority to issue water bonds specifies that the use of bond sale proceeds be used for the various capital projects; the capital projects which were presented for voters authorization at that time did not include a universal metering program; as a result, there is serious doubt as to whether it would have been lawful for Denver to have attempted to use its 1973 bonding authority in the way suggested by the federal agency. By accepting such a proposal, Denver would have clearly exposed itself to the risk of a taxpayer's lawsuit. Furthermore, its acceptance would have committed Denver to the early expenditure of the remainder of the 20 to 30 million dollars required for such a program before a competent, scientific study of the value of such a program could be completed. The BLM can rest assured that Denver will not decline the use of federal funds to finance the remainder of the Bryson study if such money can be made available without unlawful constraints attached to its use.

In the absence of the completion of the Bryson study, no federal decision with respect to the Foothills Project should be predicated upon the unsubstantiated assertion of those who have no experience in water utility operations that dramatic water savings will automatically result from the institution of a universal metering program. Comparisions with experiences in other cities are not meaningful not only because per capita consumption figures are meaningless, but because city systems vary infinitely. For instance, the City of Boulder, Colorado, with a reported per capita consumption of 180 gallons per capita per day, is only 28 gallons per capita per day less than Denver; yet Boulder, a residential community has no significant industrial or commercial use throughout its system. Again, Colorado Springs is hailed as a shining example of the universely metered city; yet the per capita water use reported by a representative of that City's water department to the Colorado Water Congress in February of 1976 for a City with minimal industrial use, higher water rates than Denver and an ambitious irrigation reuse program was still a significantly higher 244 gallons per capita per day!

Thus the statement on page 8-13 that "A major step toward a complete conservation program would be universal metering" has no foundation in utility practice or experience.

The next statement that "A basic concept in a universal metering program is a schedule of escalating rates for consumption beyond basic needs, especially during water shortage periods" is, in relation to Denver, both unproven as an effective measure and is a scheme whose implementation would be unlawful.

The premise upon which the pricing theory is based, which has yet to be demonstratively proven by any competent study, is that the demand for water service is relatively elastic so that a progressive or escalating price structure could be expected to reduce demand. Not only has the premise not been proven, but to the contrary the two most recent studies which have tested it, have shown, if anything that the demand for water service in various parts of the country is essentially inelastic. In effect, those studies contradict or modify the "popular" belief that effective water conservation can be achieved through a price mechanism. (Those studies are attached as Attachment 12E, Anderson, Raymond L., Price and Delivery of Water by Municipal and Rural-Domestic Water Systems, Northern Front Range Region of Colorado, February 1974, and Attachment 12F, Williams-Kuebeleck and Associates, The Feasibility of Achieving Water Conservation in the State of California through Water Pricing, January 1977.) The first study compares per-capita consumptions and price structures of some of the larger-sized cities along the northern front range region of Colorado, north of Denver. The researcher's results indicate an elasticity of -.1 to -.3. This would indicate that, were a 10 percent increase in price placed into effect, a reduction from 1 to 3 percent in the use of water could be expected, which is a low key response. The researcher hypothesizes that people who move into semi-arid areas, such as this, tend to bring with them the values of a humid environment; green lawns and parks are part of their expectations.

The second report, which was prepared for the State of California Department of Water Resources in January of 1977, reviewed a series of major studies, and tested the results of those studies against a series of specific case studies conducted for that purpose. The results of the study indicate:

1. There is no conclusive evidence that price levels are a prime factor influencing water use.
2. At most, it is possible to hypothesize that the price/demand relationship for water is negative and relatively inelastic.

3. Even this hypothesis is subject to clarification and qualification because any definable relationship is localized at best and seems to substantially vary from locality to locality.

4. On the basis of past studies and data there seems to be little firm basis for concluding that price is or will be an effective mechanism to achieve water conservation.

The latter report went on to comment that, in contrast to price, other water conservation programs like water rationing, moral suasion, and public education programs, have been highly effective in reducing water consumption.

But even if the economic theoreticians could succeed in validating the popular belief, the pricing mechanism could not lawfully be applied in Denver and to the existing service area served by contract outside Denver. City Charter and contract limitations prohibit such a rate structure. (See the legal opinion attached as Attachment 12G.)

Finally, the socio-economic impacts of universal metering on the large proportion of elderly and poor, who occupy the forty-five year old (average) unmetered residences is understandably, but completely ignored in the Draft Statement. Seventy-five percent of the residences old enough to be on flat rates, i.e. constructed before 1957, are appraised at values at or below $20,000. Figures from the Denver Planning Office indicate that there could be as many as 42,000 households, out of a total of 89,000 which are unmetered with annual incomes below the $8,000 poverty level. The socio-economic impact of compelling these people to meter their services could be disasterous and the final statement should clearly identify it.

In other areas, the report suggests that building codes should be revised to compel the use of water conserving

devices within the house. Denver's experience in the general acceptance of its voluntary water conservation program has pretty well proven that such a compulsory program will not be needed to achieve, good ongoing results, although the total actual water savings likely to result from such devices have not been and are not easily quantifiable.

The Draft Statement describes on page 8-14, "The Use of local storage" of treated water instead of increasing filtration capacity as a conservation method that does not appear to have been investigated for feasibility. If the statement refers to clear water storage under the title of "local storage" than the statement is totally inaccurate in suggesting that use of clear water storage has not been investigated for feasibility. Denver's nearly 300 million gallons of active clear water storage is a necessary part of the operation of its balanced water utility system; it is required to meet instantaneous peak demands in excess of filter plant capacity. It is used to balance the operation of the system for very short periods of time. To misuse such facilities as a substitute for peak day filtration capacity would be contrary to acceptable utility practice. This is so because the longer water is retained in them, its quality declines to an unacceptable level, requiring expansive and hazardous retreatment facilities to be installed in connection with them. The location of rechlorination generators in residential neighborhoods is extremely hazardous. Equally important, however, is the fact that construction of satisfactory clear water storage facilities is the most expensive aspect of water utility plant development. Again, the misuse of such facilities would also increase the energy demand for pumping. Finally, the device would not save any water. The use of swimming pools and cisterns to

avoid construction of filter plant capacity would be an absurd anachronism in the latter part of the 20th century; such devices were considered by the utility industry to be obsolete at the end of the 19th century.

The Final Statement must recognize the vigorous regulatory entry into the drinking water quality area by the Congress. In 1973 the Federal Safe Drinking Water Act was enacted to guarantee the highest quality of potable water for the nation through enforcement of federally promulgated drinking water standards. Where public health is concerned no "short cuts" or "quick fixes" can be permitted. Rather than suggesting that the concept could be used as a water conservation method which has no proven feasibility, the final impact statement should recognize that the concept will not save water, will only produce a poorer quality of water and that based on standard utility principles the concept's utilization would be unreasonable. It would be unthinkable to treat drinking water to meet the highest of standards and then let its quality deteriorate enroute to the customer just to avoid the common sense utility solution to the problem of building more filtration capacity.

Among other suggestions made by opponents of the project who suggest unworkable ideas in the name of "conservation" is the suggestion that Denver develop a dual system of water supply by which unfiltered water can be used for the irrigation of landscaped amenities within the service area. The final impact statement should address this consideration by recognizing that Denver already has maximized the use of this idea. Denver has what is in effect a very useful and effective raw water delivery system for substantial portions of the parks and golf courses within the Denver service area.

Those parks and golf courses which can take gravity delivery of water from irrigation ditches are served in this

way; in all, they total more than 1,200 acres and represent about 35% of the park and golf course land in Denver.

Page 8-16: The Final Impact Statement should more fully develop and explain the Chatfield alternative's extraordinary deficiencies. Included among those deficiencies which should be fairly discussed and properly emphasized are the recognition of the unnecessarily increased energy demands resulting from pumping and carbon reactivation which are required for this alternative, together with the increased project costs of over $100,000,000, a deterioration of the available water supply and the loss of the use of a newly developing recreational area.

The record of the public hearing contains conclusive evidence of this alternative's total unacceptability. The Final Statement must reflect that fact.

The Final Statement should include the analysis of the Chatfield alternative prepared by the Colorado Water Conservation Board under date of April 1, 1977, a copy of which is submitted herewith as Attachment 13A. In analyzing the result of that study, Mr. Felix L. Sparks, the Director of the Colorado Water Conservation Board, the only state agency with statutory authority to speak for the State of Colorado in water matters, stated in his deposition of August 24, 1977:

> * * * We consider that it is a very undesirable alternative from both an operational and economic viewpoint. As I recall, our cost analysis came up on a 50-year amortization in excess of $100,000,000 additional cost if pumping occurred from Chatfield than the proposed Strontia Springs system.
>
> Another critical factor that we can see at the outset was the continued acceleration of energy costs and pumping from Chatfield would require a considerable amount of energy, and because of the energy shortage or the critical situation of that energy, we concluded that it would not, the State could hardly endorse a project which would consume vast amounts of energy over another project which would consume virtually none.

See also attachment 13B.

Page 8-20: The upstream dam alternative is not, in a real sense, true alternative to the Strontia Springs site for the reason that, as noted in the statement, it would force the operation of the filter plant to change from the planned base-load function to a seasonal peak-load function which, rather than being limited to a nine-month period as stated in the statement, would be limited as found by studies of the Denver Water Department to a season not exceeding seven months on the average. This would be because of the existence and occurrence of slush ice and snow slush in the winter time which would create absolutely intolerable operating problems of the kind experienced by the City of Aurora as described in the deposition of Mr. David Lincoln of September 15, 1977, which is attached as Attachment 14A.

Moreover, during those periods of the year when the plant would be operational with such a facility, the quality of the water divertable would be seriously impaired as recognized in the draft statement because of the heavy sediment load which would be diverted into the system. While the statement recognizes that this would create additional costs in the disposal of sludge at the treatment plant site itself, the statement does not adequately explain the very serious problems which could result from the silting up of the diversion tunnels as has occurred in the case of the City of Aurora. A graphic description of the sedimentation problems encountered by the City of Aurora may also be derived from an examination of Attachment 14A.

In addition, it should be pointed out that the use of the low-dam alternative would not solve the continuing operating problems the City of Aurora is experiencing because the low-dam alternative would not provide an opportunity for Aurora to share the use of the diversion facility.

Finally, the statement should reflect more completely the fact that the choice of the up-stream dam alternative would preclude the use of the hydroelectric generators contemplated for the plant with the Strontia Springs Diversion Dam and would therefore result in the filter plant requiring an annual demand of about eight million khw instead of being a net supplier. In addition, because of the necessary conversion to a peak-load plant rather than a base-load plant, the statement should reflect the loss of power savings which would be expected with a year-around base-load operation of the plant. That loss is equally significant.

Page 8-26: The lower-dam alternative shares the same deficiencies described with respect to the up-stream alternative with the added extraordinary deficiency in the form of the requirement of the placement of 130,000 more yards of concrete than the Strontia Springs Dam because of the necessity for changing the design from a thin arch to a gravity-type structure. The dam, as described in the EIS, would prohibit Aurora from utilizing their facilities. Aurora requires an elevation of 5,950 feet to operate their facilities as designed. The crest of the low dam is at elevation of 5,929 feet. The low dam must have a tap elevation of 5,975 feet which is only 54 feet lower than the proposed Strontia Springs Dam.

Accordingly, the final statement should more carefully emphasize the deficiencies in the low-dam alternative in the same fashion that it does the deficiencies in the up-stream dam alternative.

Page 8-27: Elevator To The Dam Crest: Insofar as the Strontia Springs Dam structure as finally selected is of double curvature, thin arch configuration, an elevator constructed as an integral part of the dam structure is no longer possible. Therefore, the construction of an elevator or more likely an inclined railway from the canyon floor to the top of the right abutment would involve a structure separate from the dam. The construction of the separate structure would require the clearing of a lane approximately 50 feet wide from the bottom of the canyon to a point adjacent to the top of the right abutment. Additionally, this cleared lane would require considerable removal of rock from the canyon wall so that a straight line grade could be established for the installation of rails over which the rail car would travel. In order to insure year-round useability of this facility, it would be necessary to totally enclose the railway and rail car to protect them as well as the haul cable and drive mechanism from icing that will occur as a result of subfreezing winds depositing the fine spray resulting from the passage of water through the outlet works upon the facility. Such an alternative has obvious negative visual impacts and is more obtrusive than the dam crest road will be. The installation of this facility would negate a major operational safety consideration associated with having a separate access road from Stevens Gulch to the top of the right dam abutment. In the event a major flood, snow storm or icing conditions make inaccessable the access road to the dam outlet works, then secondary access is available by way of the road to the top of the right abutment.

MINOR ALTERNATIVES

Page 8-28: Fourteen-Foot Standard Road With Turnouts

The analysis of this alternative correctly states that the requirement for a roadway of maximum 14-foot standard width with turnouts would effect the safety and utility of the road. In addition, the requirement would be contrary to O.S.H.A. Regulations as evidenced by the material in Attachment

Page 8-28: For our comments regarding the leading "Underground Power and Telephone Lines", see our discussion of this issue under Page 4-1.

Page 8-29: For our comments regarding the heading "Parallel Bridge to the Keystone Bridge", see our discussion of this issue under Page 4-1.

Page 8-29, ALTERNATE NEW SOURCES OF RAW WATER:

The raw water supply alternatives described in Chapter 8 are the result of studies which were not required by law as clearly pointed out by the Acting Associate Solicitor in his 1976 Memorandum to the Solicitor for the Department of Interior (Attachment 15A). The inclusion of the raw water source of supply studies and the report on them in the Impact Statement in going beyond the requirements of law as it does, can only serve to confuse the public and possibly the federal decision makers causing them to hold an erroneous belief that the construction of the Foothills Project somehow automatically mandates the construction of any one or a combination of the suggested raw water supply alternatives without future federal review.

Already some ill-informed members of the public are misreading and therefore, misusing this section. They compare this section with testimony presented by Denver in support of due diligence in the perfection of the water rights it owns for the Two Forks Reservoir in an attempt to tie the Strontia Springs portion of the Foothills Project to the proposed Two Forks Project so that they can argue that if the United States approves Strontia Springs, it is automatically approving Two Forks. Nothing of course, could be further from the truth because even though Denver's testimony shows that Two Forks or some other facility will be required to provide ultimate supplies for a 500 million gallon per day plant, it is clear that no Two Forks Project will evolve simply because the Foothills Project exists; that project will develop when the demand for water in the Denver Metropolitan Area requires its construction. The testimony presented in the Two Forks Diligence Proceedings is excerpted in Attachment 15B. The fact that Two Forks will not be built to protect an investment in Foothills is forcefully explained by the statements of Mr. Joe D. Hall, Regional Director of the Lower Missouri Region of the United States Bureau of Reclamation in a deposition taken on August 17, 1977, and by Mr. Felix L. Sparks, Director of the Colorado Water Conservation Board in a deposition taken on August 24, 1977, excerpts from those depositions are attached as Attachments 15C and 15D. The Final Statement should more clearly emphasize, as do Mr. Hall and Mr. Sparks the fact that federal support for any of the raw water concepts cannot become a reality without full compliance with a future NEPA process. Failure to clarify and emphasize this fact can only cause further confusion which could mislead the federal decision makers in their evaluation of the merit of the Foothills Project itself.

From Denver's very considerable experience in analyzing water supply projects, it is obvious that the studies conducted for the raw water supply alternatives were done in as professional a way as possible and in as great a depth as the existing data base would permit such studies to be conducted.

Page 9-1, paragraph 7: The reference to the "Regional Solicitor" may be incorrect. See our comments regarding Page 1-7.

The page following Page 9-10 is the Table of Contents for the Appendices. It is suggested that a separate document be prepared as an Appendix to the Final Statement and that it be greatly expanded and updated. For example, Appendix 3 in the Draft Statement is out of date. Mr. Boaze had responsibility for the fish and wildlife portions of both 1976 and 1977 Draft Statements. It is clear that the position taken by the Area Office of the U. S. Fish and Wildlife Service (Appendix 3) was the extreme bias of Mr. Boaze against the project based on aesthetics and not on fish or wildlife concerns. See Attachment 16, an excerpt from Mr. Boaze's Deposition wherein he states his opposition to the project is based on the fact that placing a dam in the canyon offends him. He doesn't want to lose this "recreational experience." The significance is that, based on the record in this matter, the proposed Foothills Project causes no significant adverse impact on fish or wildlife. Thus, the U. S. Fish and Wildlife Service have no lawful basis on which to base opposition to this project.

United States Department of the Interior
BUREAU OF RECLAMATION
REGIONAL OFFICE, LOWER MISSOURI REGION
P.O. BOX 25247
BUILDING 20, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

0 0075

IN REPLY REFER TO: LM-700

SEP [illegible]

Memorandum

To: Environmental Coordinator, Bureau of Land Management,
P.O. Box 311, Canon City, Colorado 81212

From: Regional Director

Subject: Foothills Project DES

This office has reviewed the subject DES and has noted many errors which remain after our review of earlier drafts of the DES.

We can appreciate the extremely tight deadline and the problems associated with multiagency input into such a document. However, it is now imperative that these errors and other omissions or mistakes in this DES be corrected. They are marked with an asterisk in the list of detailed comments.

In addition, we would strongly recommend that the remaining comments be considered in the preparation of the FES.

Enclosure

Detailed Review Comments
Foothills Project DES

* Page 1-18, last paragraph. "1983" should be changed to "1988." (The second 125 MGD unit would have to be operational beginning in 1988).

* Page 2-7, table 2-4; June quantity should be changed from 23,000 to 22,000 otherwise column will not add up to the total shown.

* Page 2-26, table 2-14; 4/28 should be changed to 4/8.

* Page 2-31, table 2-16; Minimum water temperature is missing (should be zero). Conductivity units are micromhos/cm. Units for plankton are plankton/ml.

* Page 2-32, table 2-17; Same comments apply as those provided for table 2-16. (Missing numbers in table are zeros.)

Consistency should be established throughout DES on use of either "Waterton Canyon" or "South Platte Canyon."

Page 2-47, lines 20-21: Clarify "...natural productivity of the soil..." within context of this sentence.

Pages 2-56 and 2-58 - general: Why is vegetation and soil information included under "Wildlife" heading? Also, why is this writeup excerpted verbatim from another study instead of described specifically for the study area?

Page 2-56, lines 2-3: Documentation should be provided for statement that in the area of Strontia Springs Reservoir the primary conifer is Douglas fir.

Page 2-56, line 19: "...from Bailey to Foxton..." would read better as "... from Foxton to Bailey..."

* Page 2-56, lines 21-22: "...Douglas-fir on south-facing slopes and moist areas on those facing north" should read "...Douglas-fir on north-facing slopes and moist areas on those facing south." Typically, Douglas fir are concentrated on shady (i.e., north-facing slopes) and this holds true for Waterton Canyon.

Page 2-56, middle: A description of the "Upper Montane vegetative complex" should be provided. Also, the distinction between the Lower and Upper Montane vegetative communities should be described.

* Page 2-60, line 9: The word "bighorn" is NOT a proper noun! Why capitalize it? The Douglas in Douglas fir is a person's name and must be capitalized.

* Page 2-62, "Endangered Species": A discussion of State endangered species (e.g., river otter) present in the project area should be included here (see Chapter 8).

Page 2-82, lines 20-22: What "official list of plant species protected by Endangered Species Act?" As stated in Chapter 8 (page 8-52) the Federal Register lists only proposed endangered plant species for Colorado and the State has not published a list of endangered plants. When and by whom was Waterton Canyon surveyed for endangered plants? The statement "No known threatened (sic) plant species occur in the area" indicates that such a survey was made!

* Page 2-62, lines 35-36: This discussion of impacts should be moved to Chapter 3.

* Page 2-63, line 1: Change heading, Other Animal Species, to Other Protected and Game Species.

* Page 2-63, lines 24-30: This discussion indicates limited deer and elk use of Waterton Canyon and, as such, conflicts with Chapter 8 (page 8-51, lines 4-5) which states that "The most common big game species in the Concept A study area is the mule deer . . . followed closely by elk. . ."

* Page 2-64, lines 9-10: The black-footed ferret was adequately discussed under Endangered Species (page 2-62). Why repeat here?

* Page 2-94, table 2-30; Quantities should be changed as shown in the following three columns:

	Treated Water Used	Raw Water Used	Treated Water Annual Per Capita Per Day Use
1990	286,889	25,631	220
2000	291,124	21,176	181
2001	291,356	20,944	178
2010	293,084	19,218	154

Footnote 1/ should be changed to read "From table 1-4."
Footnote 4/is probably not necessary.

* Page 2-97, table 2-31: Does Footnote 4/ pertain to the last two columns?

* Page 2-109, table 2-33, Socio-Economic conditions, Item 1. Existing population relates to total Denver metro area. 1975 DWB Annual Report shows a population in service area of 876,400 (see page 2-2).

* Item 4. (Future - 2010) Current use trends would not continue as treatment capacity to meet max-day demands would not be available.

Item 4b. (Existing) Change 181 mgd to 215 gdc (1971-75); average maximum single day use 480 mgd (1971-75).

Item 4b. (Future) (year 2010) without the Proposed Action: Annual use of treated water 154 gdc.

* Page 2-110, table 2-33, Socio-Economic Conditions. Item 4e. (Future) (year 2010) without the proposed action. Irrigation uses percentage of residential use would decrease.

* Page 2-111, table 2-33 (cont.) Water Resources. Item 2. Delete statement concerning channelization.

* Item 2a. Add "2010 Raw water 312,300 ac.-ft.; 293,000 ac.-ft. treated.

* Page 2-112, table 2-33 (cont.) Item 2c. Future Environment (year 2010) without the proposed action. Add "112,900 ac.-ft. release Roberts Tunnel."

Item 2d. (Existing) Change to: South Platte at South Platte average annual runoff (298,000 ac.-ft.) Item 2d (Future) Same as above except... 377,000 ac.-ft.

* Page 2-112, table 2-33 (cont.) Water Resources. Item 2b. Change "58,500 ac.-ft." (1975) to "52,500 ac.-ft." (1984-73)

Page 2-113, table 2-33 (cont.) Water Resources. Item 4d. Add "(Present Modified Condition)" Also to Future Environment without "Salinity concentrations would increase by about 11 mg/l at Cameo and 7 mg/l at Imperial.

* Page 3-1, paragraph 4. Add, "...trends and expanded treatment plant capacity."

* Pages 3,2,3,4. Footnote for "N/A" "not applicable."

* Page 3-13, Colorado River Watershed, 1st sentence. Add "... at 125 mgd different than the future environment (year 2010) without the proposed action."

* Page 3-18, Table 3-5 is missing (see attachment)

* Page 3-20, Table 3-6; the units of conductivity are micromhos/cm. Units other than milligrams per liter should be identified in more detail as in tables 2-16 and 2-17.

* Page 3-24, last paragraph; 44 feet should be changed to 42 feet. The words "associated with the 125 mgd operation" should be eliminated from the first sentence because this drawdown is also associated with future non-project conditions.

* Page 3-31, Table 308; The "Years Required for Revegetation" is too low in all cases, especially for the "grassland (native)" and "riparian zones." Assuming a discussion of complete revegetation of native species (which the text seems to indicate), estimates for reestablishment of a "native" grassland generally range from a minimum of 50 to a maximum of several hundred years. Also, mature riparian stands of cottonwood and Douglas fir cannot possibly be reestablished in less than 50 years. The degree and type of revegetation referred to in the DES should be explicitly defined.

* Page 3-31, Table 3-8, line 42: "101 + 12" = 113 not "13"

* Page 3-32, lines 25-26: Define ". . . near-full production. . ." Also, documentation for the number of years required to "regain" this production should be provided.

* Page 3-32, lines 32-33: The sentence "The net effect of vegetation disturbance on wildlife species should not be significant," contradicts the discussion which follows, is misleading to the reader, is meaningless, and should be deleted.

* Page 3-32, lines 32-38: Why are impacts to wildlife discussed under Vegetation heading when Wildlife heading follows immediately?

* Page 3-33, lines 6-7: Documentation is needed for statement ". . . construction would result in little net loss of biomass."

Page 3-33, lines 41-42 and Page 3-34, lines 1-3: This paragraph is very confusing. Eliminate either the first sentence or the first clause of the second sentence.

* Page 3-34, line 15: Change subheading from Other Animal Species to Other Protected and Game Species.

* Page 3-34, line 29: Eliminate Deer and Other Big Game subheading. This would make subheadings consistent with those in Chapter 2 (page 2-63). Also, discussions of "prairie dogs" and "raptors and other birds" hardly fit under Deer and Other Big Game subheading. Eliminating this subheading would solve this problem.

* Page 3-34, lines 22-27: This discussion is extremely confusing and contradictory. First it is stated that golden eagles "would probably" abandon existing eyries during construction and then, in the very next sentence, it is stated that since the eagles are used to "people pressure" they "would probably continue to use the existing nests." Although the writeup would remain nebulous, the contradiction could be eliminated by substituting "coulds" for the "would probablys."

* Page 3-34, lines 28-29: Documentation should be provided for the statement . . . ". . . prey species (would be) attracted to the reservoir and treatment plant area."

Page 3-35, lines 7-9: This paragraph should immediately follow the golden eagle discussion.

* Page 3-65, table 3-16, Water Resources, Item 3b. "Impact of 125 MGD," Colorado River Watershed: Change "surface water" to "salinity". Item 3a. Add "...annually during the construction period." Delete "presented in Chapter 8."
(Impact of 500 MGD) Delete "presented in Chapter 8."

Pages 8-2 to 5, Table 8-1: There are numerous items under the "No Action" column in Table 8-1, indicating that there would be no impact associated with this alternative course of action. We feel that many of these are inaccurate or inappropriate and that some recognition of potential changes, impacts, etc. would occur without federal action.

* Page 8-6, 1st paragraph. Delete this paragraph. No analysis of number of shortage day with the project was made.

* Page 8-7 - Modify title on Fig. 8-1. Move "Without the Project" to below "shortages" line.

* Page 8-8 - Fig. 8-2, correct 97,174 to 87,174 and modify title similar to Fig. 8-1.

The quantity 12,216 should be changed to 11,662 (two locations in the figure). The quantity 286,115 should be changed to 286,669

* Page 8-11 - second paragraph: Delete the sentence beginning: "At the current average water months use..." This statement is inappropriate for this section.

Last paragraph, same page: modify biased statement on DWB authority to add a $10 surcharge, etc. and instead describe the current water restriction and penalties associated with the summer 1977 restriction program.

* Page 8-10, table 8-3: The historic average is for the period 1964-1973, not 1965-1974.

Page 8-12 - Rewrite "Conservation-Education" paragraph, bottom of page, to reflect current activities. Delete "According to the DWB..."

Page 8-14 - Modify paragraph under "System Improvements" - the statistics presented in the Denver Water Board's annual statements and in American Water Works Association Journals indicate clearly that the Denver Water Board distribution system is efficient and experiences below average national loss rates.

* Page 8-15, first paragraph under Water Resources: Reference to table 2-27 and 2-7 should be changed to 2-31. Reference to table 2-28 should be changed to 2-32 (two instances). The quantity of 409 percent should be changed to 509.

Page 8-15 - - Following the 1st paragraph add:"It would appear that many of the conservation measures listed above should be implemented immediately; however, it should be recognized that the addition of a number of conservation measures do not necessarily result in accumulative gain by each measure employed. For example, the introduction of metering and revised water pricing could result in substantial water savings when implemented individually, but if both programs were employed the joint reduction might be less than the sum of the two programs.

Page 8-16, second paragraph: Reference to figure 1-3 should be changed to Map 1-3 (two instances). The quantity 470 feet should be changed to 104 if it was meant to be the difference in the two elevations.

Page 8-17, under "Socio-Economic Conditions" - It should be pointed out that the Chatfield alternative would have high energy requirements to pump the water from Chatfield Reservoir to the treatment plant and could have serious impact on the energy available to the metro area.

Page 8-25, fifth paragraph, second line: Delete the term "high quality." The long term recreational impact on recreational activities in the canyon should be added to this paragraph.

* Page 8-32, first full paragraph: The quantity of 378,400 should be changed to 378,600.

Pages 8-29 to 8-119, Alternative Sources of Raw Water - general: The headings and subheadings which were removed from these pages (e.g., South Platte River System, Moffat System) should be reinstated. In the "Table of Contents," over 90 pages of highly pertinent information merit only eight subheadings whereas less than 30 pages of generally infeasible alternatives rate more than 20 subheadings. (See 8-1 to 8-29)

Page 8-34 - Delete note (revised 5/13/77)

* Page 8-35, table 8-4: The word "Exchange" should be replaced with "Acquisition and Exchange" (same change on table 8-8 and 8-10).

Page 8-36, Second paragraph, third line: Change 11 S. to 7 S.

Page 8-44: Correct spelling of "forest" - 18th line, middle of page.

Page 8-50, line 19: Subheading "Important and Endangered Wildlife Species," should be "Important Wildlife Species." "Endangered Species" is a subsequent subheading and the prior format calls for a higher order subheading here.

Page 8-50, line 21: The bighorn information included is not taken directly from the study provided in Appendix 1 (i.e., 1977 vs 1973).

Page 8-51, lines 27-29: "Generally speaking, (sage and sharp-tailed) grouse species inhabit the higher and middle elevations..."? Not according to the available literature. These two species of grouse primarily inhabit open grasslands and sagebrush flats.

Page 8-61, third paragraph, last line - Change "difficult" to "difficulty". Last paragraph, second line, change the number 43,064 to 43,065.

Page 8-63, last paragraph. The quantity 205,000 should be reduced to 195,000. The quantity 30 mg/l should be changed to 29 mg/l.

Page 8-64, last line. Insert the letter "a" to read: "the loss of riparian timber and a decrease...."

*Page 8-67, first paragraph, 8th line. Change 8.6 to 9.9 miles.

*Page 8-74. Delete the term "revised 6-13-77."

*Page 8-74, figure 8-4. The exchange quantity of 10,000 in the figure should be changed to 109,000.

*Page 8-82. The penultimate paragraph should be rewritten as follows: The aquatic resources of the South Platte River, North Fork of the South Platte River and Colorado River have already been described in the discussion for Concept A.

*Page 8-93, table 8-10; The exchange quantity in the last column should be changed from 59,600 to 59,000.

*Page 8-95 - Delete the term "revised 5-13-77."

*Page 8-98 - Second paragraph, first line - insert the word "about" after "would be."

*Page 8-100 - Sixth paragraph - change 1.5 to 1.3 miles.

*Page 8-109 - Last paragraph, fifth line - insert the word "about" in front of 80 ft.

*Page 8-110 - Fifth paragraph, third line - insert the word "about" in front of 150 ft.

*Page 8-115, third paragraph; the words "chemical species quantities" should be replaced with "concentrations of chemical constituents."

*Page 8-115, fourth paragraph; the quantity 268,000 should be changed to 266,000. The quantity 24 mg/l should be changed to 23 mg/l.

Suggested changes in Table of Contents (page vi)

- Alternate New Sources of Raw Water 8-29
  - Introduction 8-29
    - General 8-29
    - Criteria for Water Supply Concepts 8-31
  - Concepts 8-32
    - Concept A 8-32
      - General 8-32
      - Description 8-36
        - Features and Operation 8-36
        - Present Environment 8-38
      - Analysis 8-58
        - Environmental Impacts 8-58
    - Concept B 8-72
      - General 8-72
      - Description 8-76
        - Features and Operation 8-76
        - Present Environment 8-80
      - Analysis 8-87
        - Environmental Impacts 8-87
    - Concept C 8-93
      - General 8-93
      - Description 8-96
        - Features and Operation 8-96
        - Present Environment 8-102
      - Analysis 8-107
        - Environmental Impacts 8-107

TABLE III-5

PROJECTED MONTHLY AVERAGE DISCHARGES OF THE NORTH FORK SOUTH PLATTE RIVER AND THE SOUTH PLATTE RIVER

Units: ft^3/s

	1990 1/ Without Project				1988 1/ With Project			
Month	Future Roberts Tunnel Imports	North Fork South Platte at Grant	North Fork South Platte at South Platte	South Platte River at South Platte	Future Roberts Tunnel Imports 2/	North Fork South Platte at Grant	North Fork South Platte at South Platte	South Platte River at South Platte
January	152	169	191	158	142	159	181	248
February	148	163	182	247	136	151	172	237
March	145	163	188	268	135	153	178	258
April	189	215	272	477	175	201	258	463
May	179	301	520	1045	169	291	511	1036
June	30	271	505	925	56	297	531	951
July	90	246	377	777	131	287	416	816
August	199	284	403	719	240	325	442	758
September	218	265	326	521	199	246	309	504
October	208	246	295	410	193	231	280	395
November	159	188	226	317	148	177	216	307
December	152	174	195	265	143	165	185	255
Annual Average	156	224	307	521	156	224	307	521
Acre-Feet	112,900	162,300	222,600	377,100	112,900	162,300	222,600	377,100

1/ The future imports have been reduced by 5% loss at South Platte stations.
2/ Based on population projections and historical use patterns, the 112,900 acre-feet raw water available in Dillon Reservoir would be in use by 1988.

United States Department of the Interior
GEOLOGICAL SURVEY
RESTON, VIRGINIA 22092

OFFICE OF THE DIRECTOR

In Reply Refer To:
Mail Stop 760

SEP 15 1977

Memorandum

To: District Office, Bureau of Land Management
Canon City, Colorado

Through: Acting Deputy Assistant Secretary--Energy and Minerals Richard E. Dawes SEP 20 1977

From: Acting Director, Geological Survey

Subject: Review of draft environmental statement for Foothills Project, Denver County, Colorado

We have reviewed the subject draft environmental statement as requested in the notice of August 15 from the State Director.

The statement should assess the potential for effects of tunnel grouting operations on existing wells in the fractured rocks. Also, effects of the proposed impoundment on ground-water levels in the vicinity of the project area should be addressed, as should potential effects on ground-water quality.

Henry W Coulter
Acting Director

REGION XII
NORTH WEST COLORADO COUNCIL OF GOVERNMENTS
Holiday Center Building - Suite 200
P. O. BOX 737
FRISCO, COLORADO 80443
(303) 468-5445

AGLE COUNTY
BASALT
EAGLE
GYPSUM
MINTURN
REDCLIFF
VAIL

RAND COUNTY
FRASER
GRANBY
GRAND LAKE
HOT SULPHUR SPRINGS
KREMMLING

ACKSON COUNTY
WALDEN

TKIN COUNTY
ASPEN

OUTT COUNTY
HAYDEN
OAK CREEK
STEAMBOAT SPRINGS
YAMPA

MMIT COUNTY
BLUE RIVER
BRECKENRIDGE
DILLON
FRISCO
ILVERTHORNE

September 26, 1977

Mr. Dale Andrus, State Director
Bureau of Land Management
1600 Broadway
Denver, Colorado 80203

RE: Draft EIS Foothills Project

Dear Mr. Andrus:

Thank you for the opportunity to review the draft of the subject Environmental Impact Statement.

The Northwest Colorado Council of Governments (NWCCOG) is an organization of 6 counties and 23 municipalities, primarily within the Colorado River Basin. It is our opinion that many of the impacts of the proposed project will be realized in the Colorado River Basin and that the draft impact statement is deficient in fully examining these impacts and their relationship to the proposed project. We further believe that the impact statement is deficient in not exploring all feasible alternatives to the project proposal.

NWCCOG has been designated by Governor Lamm as a Section 208 Areawide Water Quality Management Planning Agency. As such, one of our primary concerns is the effect of proposals for additional water supplies from the Colorado River Basin will have on our ability to achieve the water quality goals specified in the Federal Water Pollution Control Act Amendments (PL 92-500) for the designated planning area. Our comments will, therefore, focus on the impacts that the proposal will have on water quality and the relationship of the proposal to the 208 Plan being developed by our agency under PL 92-500. Our comments on the DEIS are as follows:

1. Effectiveness of Project Without Additional Raw Water Supplies

The DEIS demonstrates that the proposed Foothills project has limited if any effect on available water supplies within the Denver service area without additional raw water supplies being made available to be treated at the plant. This is demonstrated through a comparison of Table 2-30 and Table 3-2, which indicates the only difference without the project would be a deficiency of 4,709 acre feet in 1985. Annual per capita usage would have to be reduced from a projected 228 gpcd to 224 gpcd without the project (this compares to a current rate of 208 gpcd) to compensate for the projected deficiency in supply vs. demand.

Beyond the 1985-1988 time frame, information contained in the two tables cited above implies that an equal degree of water shortage would exist with and without the project.

It can therefore, be asserted, that construction of the Foothills Project without provision for raw supplies of raw water will only provide an additional 2% of treated and raw water to the service area through a relatively short time span (1985-1988). Beyond that time, water supplies would be in equally short supply within the service area, falling short of the project objective as stated on p. 1-12.

Since the objectives stated under "Purpose and Need" (p.1-12) indicate that the purpose is to provide treated water consistent with current trends of consumption within the service area, we can only conclude that future raw water supplies are an integral part of the project over the long run. Without including raw water supplies as part of the project, the objectives would not be met in either case. The EIS must, therefore, consider the proposed Foothills project as part of a collection and treatment system and consider the full impacts of both in our opinion.

2. Project Objectives

Certainly the project justification statement itself (p. 1-12) could be questioned since it clearly implies that the need for the project is based on an assumption that current consumption trends within the service area will be a constraint in evaluating the effectiveness of alternatives. This clearly rules out conservation and re-use options at an early stage in project formulation since these options would alter the current trend of consumption. This is a major deficiency in the DEIS since conservation and re-use are major alternatives which should be considered and evaluated.

3. Foothills Plant Siting and Sizing

The DIES states (p. 3-13) that with the initial 125 MGD capacity of the plant, there will be no impact on water resources or water quality in the Colorado River Basin. We believe that with the operation of the 125 MGD facility there would still be impacts on the Colorado River Basin and that the siting of the facility precludes all options other than new transbasin diversions (concepts A, B, C) as part of water supply alternatives for needs to be met beyond 1985.

Operation of the 125 MGD facility will have impacts on the Colorado Basin since current rates of diversion from the Blue River Basin are less than the Roberts Tunnel System current capabilities and future diversion rates would increase in order to supply raw water to the treatment facility. At least 4,700 Ac-Ft additional water would be diverted with the initial facility than without it (Tables 2-30, 3-2). This would not include water which would not need to be diverted from the Roberts System with the implementation of water conservation measures as an alternative to increasing water treatment capacities and raw water supplies. For instance, it is estimated that water savings of up to 30%[1] can be achieved through an active water conservation program including water metering, revised building codes and retrofit programs requiring water conserving devices, pricing structures, and lawn and garden irrigation controls. This alternative could possibly fill the needs of the Denver Area beyond the planning period allowed in the 125 MGD proposal without substantial expenditures.

The siting of the Foothills Project eliminates major alternatives for water supply which were not adequately addressed in the DEIS. This includes direct re-use and water conservation.

4. Impacts of Full Level of Operation

As stated in the DEIS, the 500 MGD operation sould have substantial impacts on water resources and water quality in the Colorado River Basin. These should be considered as secondary impacts of the project rather than being discussed as impacts of alternative water supply concepts since the water collection system is an integral part of the proposal. In addition to the impacts enumerated in the DEIS and water the section on Water Supply Concepts, the following impacts should be considered:

A. Salinity

Depending on the alternative supply concept chosen, Colorado River salinity is expected to be increased between 18 mg/1 and 30 mg/1 at Imperial Dam. Although the DEIS correctly states that these depletions are allowed for under the terms of the Colorado River Salinity Program, the impacts of salinity due to these proposed diversions and methods to mitigate these impacts need to be fully disclosed under NEPA requirements.

For instance, utilizing the salinity increases (24 mg/1) anticipated from Concept C and $395,000/mg/1 damages, the economic damages to Colorado River water users due to salinity increases could be expected to be in the order of $9.5 Million annually. (Source USBR-Colorado River Salinity Control Program). This can also be presented as a present value of $190 Millon utilizing a 5% discount rate. For comparison, the economic impact due to salinity increases would be greater than the initial $133 Million cost of the Foothills Project.

It is presumed that since the DEIS cites the Colorado River Control Program, that the Bureau of Land Management is relying on salinity control measures outlined in that plan as mitigating

---

[1] North Marin County Water District, "North Marin's Little Compendium of Water Saving Ideas," 1977.

measures for salinity increases due to the project. However, the salinity control program requires expenditures of Federal funds through the Bureau of Reclamation to off-set the salinity increases. The salinity control program outlined by the Bureau of Reclamation is estimated to have a cost of $125 Million (1973 $) to achieve an estimated benefit of $10 Million in annual salinity damage reduction. Stated in another sense, the entire salinity control program ($10 Million in annual benefits) will only slightly more than offset the $9.5 Million in annual damages caused by the proposed project. A significant portion of the $125 Million Federal expenditure could be avoided if the Foothills project and collection system were not built and still maintain the same net effect in terms of salinity damages and salinity increases in the Colorado River.

A substantial portion of the $125 Million investment of the Bureau of Reclamation, therefore, becomes a legitimate part of the project costs which have not been considered in project formulation or evaluation, but rather have been externalized to either Colorado River Basin Water users in the past or provided as an indirect federal subsidy to water resource development.

Another impact related to salinity damages is the distribution of costs related to salinity control. As noted above, impacts on salinity due to transbasin diversions such as the water supply component of the project are in effect being assumed by the Federal Government. Other users of Colorado River Basin water, however, will not fare so well under current State and Federal policies. Costs of implementing "best management practices" for irrigated agriculture in the Colorado River Basin will be borne by the water user as well as costs necessary to control discharges of salts from municipal and industrial sources.

NWCCOG believes the current policies of the Department of the Interior regarding salinity control are aimed at only a minor portion of the salinity problem and contribute to federal subsidy of water resource development on the eastern slope of Colorado at the expense of Colorado River Water Users. This is a significant issue related to the development of projects such as Foothills which is certainly within the control of the Department of the Interior.

B. Fisheries and Recreation

The major goal of the Federal Water Pollution Control Act Amendments (PL 92-500) is the attainment of water quality suitable for fishing and swimming. The DEIS clearly recognizes (p. 8-31) that future expansion of collection systems related to the proposed project will have to be performed in accordance with the provisions of PL 92-500. A key component of that Act is Section 208, or areawide water quality management planning. The "208 Plan" being prepared by NWCCOG for virtually all the

area for which the future water collection system expansion is contemplated, related to the project, will consist of four components:

1. Point source management
2. Non-Point source management
3. Hydrologic modification management
4. Management system

Once certified by the Governor and approved by the Environmental Protection Agency (EPA), the recommendations of the 208 Plan become part of the requirements of PL 92-500. In order to attain the "fishable/swimmable" goals specified in that act, each of the above components must work in a coordinated manner. The proposed collection system project, without substantial management imposed on operating procedures, minimum streamflow requirements and other project features, could have the following impacts on these goals: (The degree of impact would of course depend on the actual "concept" chosen for future water supply).

-Blue River Basin

The Colorado Department of Health has established special water quality standards for Dillon Reservoir and NPDES permits have been issued to five point source discharges requiring advanced waste treatment. Each of the three conceptual water supply systems would modify the current operations of Dillon Reservoir, substantially changing the volume of water available for dilution of phosphorus in the reservoir. Since the waste discharge permits are directly related to reservoir volume, reservoir drawdown would violate the water quality standards on a regular basis unless even more sophisticated phosphorus removal were applied. NWCCOG estimates that a substantial change in reservoir drawdowns such as anticipated in Concepts A and B would require a level of treatment for these discharges equivalent to "reverse osmosis". The cost of this system within a 20 year time span for anticipated population is estimated at $1.0 Million/Year (capital and operation costs).

All three concepts involve diversions of water from other watersheds to Dillon Reservoir. In order to maintain the water quality standards, the watersheds of the proposed diversion projects will need to be intensively managed for that purpose. The two concepts involving diversion of Straight Creek water would necessarily involve substantial watershed correction measures as can be demonstrated by the existing degraded quality of that watershed evidenced by high concentrations of suspended sediments, phosphorus and salinity. The costs of corrective measures necessary to protect Dillon Reservoir to the degree required could be substantial. For instance, the Colorado Department of Highways estimates that approximately $1.0 Million will be required for stabilization of existing cut slopes along Interstate 70 on Straight Creek. Again

the issue of who pays for water quality improvements required because of diversion of non-native water becomes a key issue.

Finally, diversion of water from the Eagle River at Wolcott to Dillon Reservoir would introduce nutrients from the Eagle Valley into Dillon. This would act counter to all current efforts to control the discharge of phosphorus to Dillon Reservoir to meet the existing water quality standards. It is conceivable that all waste discharges upstream of Wolcott would eventually require phosphorus removal because of their physical connection with the Dillon Reservoir System.

-Eagle River Basin

Water supply Concept C envisions the substantial part of the system expansion from the Eagle River. A similar situation with regard to treatment levels for point source discharges exists in this basin as in the Blue River Basin. EPA is currently in the process of awarding a $6.0 Million construction grant for advanced wastewater treatment for a discharge to Gore Creek and another discharge to the Eagle River. Both of these facilities are designed according to historic minimum streamflows. According to EPA's "Environmental Impact Statement for the Upper Eagle Valley and Vail Wastewater Treatment Facilities" the minimum streamflows would be reduced to approximately 50% of historic minimum flows due to diversions from the Denver Water System. Since the design of these facilities is directly related to streamflow, the design criteria would need to be twice as stringent than currently designed to meet water quality standards. The cost of this treatment level is not currently known but failure to maintain historic minimum streamflows will jeapardize the current public investment in wastewater treatment facilities.

-Fraser/Williams Fork Basins

Water supply Concept System C envisions 47,000 Acre-Feet of water system expansion from the Fraser/Williams Fork System. A nearly identical situation with treatment levels would exist in the Fraser Valley as exists in the Eagle Valley. Public Investments currently underway in advanced wastewater treatment facilities for the Fraser Valley and Granby would be jeopardized by the proposed system.

In summary, the proposed project and associated water supply system concepts pose a severe threat to achieving the water quality goals established under the provisions of the Federal Water Pollution Control Act. Without management of hydrologic modifications, the costs to Colorado River Water Users could be substantial. In order to mitigate these impacts, NWCCOG is proposing to the Governor and EPA, that hydrologic modifications must be managed to the same degree as other sources of water quality degradation. The proposal consists of designated management agencies, establishment of a permit system for future hydrologic modifications within the area, establishing required minimum streamflows, NPDES Permit conditions, a system of fees related to water quality damages and a complex system to offset damages due to proposals for future diversions.

5. Conservation/Re-Use Alternatives

As stated previously, one of the major deficiencies in the DEIS is the failure to consider conservation and re-use as a major alternative to the proposed action. It is our belief that when the full costs of expansion of new water supplies is compared against this alternative, that conservation and re-use are cost-competitive with developing new water supplies. This can be demonstrated as follows:

1. The Denver Regional Council of Governments (DRCOG) estimates the cost of developing new water supplies at approximately $2,700/Acre-Foot (Source DRCOG "Clean Water Program").

2. DRCOG also estimates the cost of potable water re-use to average $3,500/Acre Foot of water produced. This is the most expensive of any of the alternatives relating to conservation or re-use. Water metering, conservation programs and other methods to reduce water consumption would be less expensive.

3. Colorado River Salinity Damages can be computed equivalent to $1,544/A-F. (Utilizing Concept C, 24 mg/1 TDS increase, $395,000/mg/1 TDS, 5% discount rate and 123,000 A-F water produced).

4. Other water quality damages can not be fully quantified but could include treatment costs in the Blue, Eagle, and Fraser Sub-Basins.

5. The costs of new raw water supplies would therefore be as follows:

	$2,700/A-F:	DRCOG Estimate for Water Supply System
	$1,544/A-F:	External Salinity Damages (Colorado Basin)
	$4,244	Sub Total
+		Non-quantifiable Treatment Costs
Total:	$4,244 +	Non-tangible costs

It would therefore, appear that including all costs relative to raw water supply, direct re-use is a more cost effective alternative.

NWCCOG urges the BLM and Department of Interior to evaluate all of the impacts and costs related to the proposed project. It appears clear to us that we have reached the point in time with our limited resources that we can no longer afford to continue to develop new water supplies without giving other alternatives full consideration.

Sincerely,

Phil Overeynder
Phil Overeynder
208 Coordinator

PO/bb

COLORADO ENVIRONMENTAL HEALTH ASSOCIATION
P. O. Box 4061 • Denver, Colorado 80204

Mr. Dale Andrus
State Director
Colorado Bureau of Land Management
Department of the Interior
1600 Broadway
Denver, Colorado

Dear Mr. Andrus,

The Board of Directors of the Colorado Environmental Health Association wishes to take this opportunity to comment on the Bureas's (BLM) Draft Environmental Impact Statement (DES) on the proposed Foothills Project. In line with the National Environmental Policy Act, we believe that the public disclosure requirement can be beneficial to all parties concerned, and we hope that thoughtful public comment will aid in the final decision making process. On the surface, it would appear that the BLM's direct interest in this project is not major. However, the private aspects of this project are certainly of major significance. Thus, in making any decision on this project the BLM must share some of the responsibility for the ultimate fate of the project.

Our review of the statement raises several questions as to the need for the project. To quote the DES on p. 8-6:

> "The no action alternative would result in the occurance of peak day shortages about two years sooner than if the project were constructed. However, by 1990 and beyond customers in the DWB service area would experience an equal number of water shortage days with or without the project." (emphasis added)

Additionally, the max-day per capitause figures as shown in Table 1-4, p. 1-17 begin at 614 gpc for 1980 and increase to 742 gpc by the year 2010. These figures seem unreasonably high in light of the max use day figure of 355 gpc for the drought summer of 1977. In view of continuing DWB watering restrictions, it would appear doubtful that per capita use could almost double in the space of three years.

Other concerns that the Board has regarding the proposed project relate to the air quality, secondary impacts, and project alternatives. These are discussed below.

AIR QUALITY

The DES states on p. 2-101:

> "By 1981, carbon monoxide emissions would be reduced to an allowable level for human health; and by 1988, total vehicular emissions for hydrocarbons would be reduced to limits allowable for human environments."

This statement may be incorrect.

The Colorado Air Pollution Commission's Report to the Public, 1976, which was available during the statement preparation process states on pp. 49 and 54:

> "Both the 1-hour standard of 35ppm and the 8-hour standard of 9ppm for carbon monoxide will be violated in the Denver metropolitan area in 1980 and 1985." (emphasis added)
>
> "Particulate levels in 1980 and 1985 will violate both the annual standard of 45 micrograms per cubic meter and the 24-hours standard of 150 micrograms per cubic meter."
>
> "The particulate standard is violated now, but actual amounts of particulate matter in the air will be greater in future years."
>
> "Although the nitrogen dioxide standard presently is not violated, it likely will be in 1980 and 1985."

The fact that these pollutante pose serious health problems for the community has been well documented. In fact, the additional factor of altitudinal effects increases the dimensions of the problem.

SECONDARY IMPACTS

The DES has, to our view, totally omitted any evaluation of the secondary impacts of the Foothills Project. Although the DES discounts the growth issue, the project is, in fact, intimately related to growth. Proponets of the Foothills Project appear to see the project as a means of dealing with growth symptoms. This, though, really only postpones dealing realistically with the issue of growth limits for the Denver metropolitan area. Opponets of the Foothills Project see other alternatives that must be applied. These alternatives recognize natural constraints of growth in this region.

The Denver Water Board service maps shown on pp. 1-15 and 1-16 seem to indicate the Water Board's intent to sell as much water as possible to developing suburban areas. This seems to place the Water Board in the role of determining the directions of growth. This land-use role may more appropriately lie with other local governmental entities.

Water quality is another secondary impact that we are concerned with. We feel that since traditionally adequate sewage treatment plant construction usually lags behind development, water supply planning and 201 and 208 planning should be closely coordinated. The DES should have addressed the matter of whether projected sewage treatment plant construction will be adequate to treat the additional wastewater if the proposed development occurs. In addition, we feel more emphasis should be placed on increased Colorado River salinity problems that deal with extensive transmountain water diversions as discussed in Chapter 8 of DES.

ALTERNATIVES

We feel that the no-action alternative may be inadequate because it does not attempt to quantify water savings through non-project related alternatives such as education, enforcement of lawn watering restrictions, meter installation on existing taps, building code changes etc. Other possible alternatives such as additions to present treatment plants are not mentioned. Recycling and additional treated waste storage appear to be discussed in only a cursory fashion.

SUMMARY

As environmental and public health professionals, we realize and appreciate the need for a reliable, safe, and adequate water supply. However, this project has other possible far reaching social, economic, political, geographic, and environmental consequences for the Denver metropolitan area. As such, we will defer any recommendation on your decision until we have reviewed the final statement.

Sincerely yours,

Harry Goens, Jr.
Harry Goens Jr.
President, Colo. Env. Health Assn.

Adopted by CEHA Board of Directors on September 26, 1977.

cc. Gov. Richard Lamm
Sec. of Int. Cecil Andrus
Sen. Floyd Haskell
Sen. Gary D. Hart
Rep. Patricia Schroeder
Rep. Tim Wirth

September 23, 1977

COLORADO OPEN SPACE COUNCIL 1325 DELAWARE ST. DENVER, COLO. 80204 303/573-9241

Bureau of Land Management
Canon City District Office
3080 E. Main St.
P.O. Box 311
Canon City, Colorado 81212

Subject: DEIS on Proposed Foothills Project

The Colorado Open Space Council is a state-wide coordinating council composed of conservation, recreational and professional organizations as well as some 1,000 individual members. The conservation and wise use of Colorado's natural resources have been primary concerns of our organization for many years. We believe that comprehensive, long-range planning of water resources development is essential if optimum use of our water and land is to be realized. It is from this point of view that we have followed the Denver Water Board Foothills Project from the time it was first proposed.

This written statement along with the two attached statements which were presented orally at the hearings are being submitted for the hearing record as the comments of the Colorado Open Space Council.

From our study of the DEIS on the proposed Foothills Treatment Project, we found two major areas particularly inadequate.

First, the draft EIS is very inadequate in its discussion of a water conservation alternative. The statement made by Pam Turner on behalf of the COSC water workshop at the hearings on September 15 details the inadequacies of Section 8 of the DEIS, in particular. (Statement attached). There is no information in the DEIS regarding what savings can be accomplished by a water conservation alternative or what the costs would be if such an alternative were chosen.

We would like to have seen more analysis of existing consumption patterns. For instance, this past summer the maximum consumption was approximately 340 mgd. Without Foothills, the projected treatment capacity is 573 mgd (Table 8-2, page 8-9). If the peak demand per capita stays the same as it was this past summer, an additional 70% increase can occur in the DWB service area population without the construction of the Foothills Project. Thus, taking the figures and population projections in the DEIS, we can conclude that there would not be a need for a new facility until 2010—33 years from now. This certainly does not support

a state-wide environmental coordinating council

the claim by the Denver Water Board that the Foothills Plant is needed now to provide additional treatment capacity to meet peak day demands during summer months. Modest conservation measures can keep the consumption within the existing treatment capacity.

Comparative information on water consumption would be very useful in evaluating the DWB figures and projections. For instance, the volunteer water savings program in Englewood, we understand, saved more water this past summer than did Denver. Boulder has managed, without mandatory water conservation measures, to maintain an average per capita consumption far below that of Denver. It can be concluded, from comparisons with other cities, that the Denver Water Board projects water needs based on unrealistic or inflated per capita consumption figures.

In reality, the Foothills Treatment Plant is designed to treat additional new raw water supplies from Two Forks reservoir and other transmountain diversion projects. On page 8-6, the DEIS states:

> "The no action alternative would result in the occurrence of peak day shortages about two years sooner than if the project were constructed. However, by 1990 and beyond, consumers in the DWB service area would experience an equal number of water shortage days with or without the project."

Secondly, we have found the DEIS inadequate in its analysis of the direct impacts on recreational resources, the socio-economic impact upon South Platte communities and in the information regarding the expansion of the Denver Water Board's service area. The statement made by Purnee McCourt, chairman of the COSC Land Use Workshop, addressed these areas. (Statement attached).

It is our strong belief that among the most important objectives of an environmental impact study is the evaluation of alternatives to a proposed action as well as a full disclosure of the environmental impacts of the proposed action. The present DEIS contains a great many pages of text, tables and maps, but fails to meet the objectives which we believe are the purpose of an EIS.

Sincerely yours,
COLORADO OPEN SPACE COUNCIL

Mary C. Taylor

Mary C. Taylor
President

Attachments: Water Workshop Statement
Land Use Workshop Statement

United States Department of the Interior

FISH AND WILDLIFE SERVICE
AREA OFFICE COLORADO—UTAH
1426 FEDERAL BUILDING
125 SOUTH STATE STREET
SALT LAKE CITY, UTAH 84138

0 0085

In Reply Refer To (ES)

September 29, 1977

TO: Director
Bureau of Land Management
Washington, D.C.

FROM: Acting Area Manager
U. S. Fish and Wildlife Service
Salt Lake City, Utah

SUBJECT: Review of Draft Environmental Statement for the Proposed Foothills Project

We have reviewed the subject draft and request that the following comments be included within the departmental response.

General Comments:

In general, the draft environmental statement adequately describes the existing fish and wildlife resources and evaluates project construction impacts of building Strontia Springs Dam and operating it in conjunction with the Foothills Treatment plant to provide an additional 125 million gallons per day (mgd) capacity to the Denver Water Board's system.

It does not: however, adequately assess the impacts of construction, operation, and maintenance of a 500 mgd water system as proposed in concepts A, B, and C.

It is our understanding that expansion to the 500 mgd level will be addressed in a seperate environmental impact statement.

The statement does not consider other logical structural alternatives such as a conduit system that could carry the water from the mouth of the Roberts Tunnel to the proposed Foothill treatment plant. Such an alternative would reduce the adverse environmental impacts on fish and wildlife resources associated with the proposed project at 125 mgd and may significantly reduce adverse impacts associated with alternatives A, B, and C. Also, this alternative may offer additional opportunities for hydroelectric power-generating capability.

Specific Comments:

1-31 Paragraph 1 - It is questionable whether or not the identified aggregate site will be sufficient to meet all construction needs. It seems appropriate to discuss a secondary site and the potential impacts associated therewith.

2-28 Paragraph 5 - Discussion of average annual flows would be much more understandable if flows were presented in CFS.

2-37 Paragraph 2 - Generally speaking, the term "catchable size" refers to trout 8 inches or larger.

2-39 Table 2-21 - Under number of fish per acre for the lower South Platte River, the figure should be 350 @ .20 lb.

2-43 Table 2-24 - Footnote number 2/ does not appear anywhere in the table.

2-57 Table 2-26 - It would be helpful if the size of the sample area was indicated. It is questionable that riparian vegetation representing only 2 percent by composition accounts for 37 percent of the yield. This seems unusually high.

2-62 et al, Endangered Species - All entries regarding the American Peregrine Falcon should reflect the Services' threshold examination and transmittal of findings in our August 5, 1977 memo. The memo should also be included in the Appendix of the final environmental statement.

3-32, Vegetation - Under this section the statement indicates a loss of riparian vegetation and goes on to say that impacts on wildlife species would not be significant. Given the tremendous yield (Pounds per Acre per Year) shown for riparian vegetation on Table 2-26 this seems inconsistent.

3-33 Paragraph 4 - The impact of constant harassment and noise associated with construction will have deleterious effects on virtually all wildlife not just Bighorn sheep.

3-65 Table 3-15 - Under aquatic resources number 1 - It is questionable that removal of 1 acre of aquatic habitat would result in the loss of 192 lbs. of trout.

4-1 Paragraph 4 - Limiting the clearing of vegetation is not a "benefit to aquatic life" rather a reduction of construction impacts.

4-3 Paragraph 1 - Bypasses for fish flows should read 60 CFS May 15 to September 15, 30 CFS September 16 to May 14, or the natural inflow whichever is less. The possibility of using stored water for fish flows under Colorado water law is questionable, and why should the DWB be given "consideration" for this in future projects? Each project should be evaluated on its own merits.

We find no discussion for mitigating terrestrial wildlife losses via acquisition of replacement habitats. This approach should certainly be considered in the final environmental statement.

5-22 Table 5-6, item C - The phrase "but they are few" slights the importance of mule deer, mountain lions, and bear to the overall ecological balance of the area.

8-64 Paragraph 5 & 6 - If birds referred to as northern bald eagles are nesters in the area, there's a good chance they are the southern subspecies.

8-65 Endangered Species - The Concept A alternative seems highly unlikely based on the endangered species conflicts cited here.

Summary Comments

Alternatives to the proposed project at 125 mgd are not well described, but we believe the information presented is adequate to make a decision as to how the Denver Water Board should meet its short term (1990) needs.

The total raw water supply presently available to the Denver water Board system is 312,300 acre-feet annually (Draft EIS page 2-91). This supply is adequate to meet the needs of the Denver Water Board service area to the year 1990 (Draft EIS Table 2-30, page 2-94), assuming water use restrictions are imposed. The nature, extent, and impact of these restrictions are underfined. However, with the use restrictions imposed in the Denver Water Board's service area this summer, maximum daily use was approximently 335 million gallons for a population of about 876,400 (Draft EIS page 202). If we assume a similar per capita consumption rate for the projected 1990 population of 1,162,900, the peak daily demand could be expected to be approximately 450 million gallons per day. This could be easily accommodated by the Denver Water Board's present capacity of 520 million gallons per day (Draft EIS page 1-18).

The above analysis indicates the Denver Water Board has the capability of meeting the needs of its service area well past the year 1990 without constructing any new storage, diversion, or treatment facilities. This period might be extended by using water more efficiently, improving conservation measures, and recycling water. The various measures that can be used to pursue these goals are well known and have been frequently discussed in public and private forums.

Recognizing this, we believe the continuance of present water use restrictions are the least environmentally damaging alternative that can be used to meet the Denver Water Board's service area's needs to the year 1990 and recommend that alternative be selected. Without judging the desirability or lack thereof of continued growth in the Denver Water Board's service area, we recommend that work begin immediately on developing alternatives to meet the water needs of the Denver Water Board's service area beyond the year 1990. These studies should include consideration of all technically feasible conservation methods and the pipeline alternative referred to in our general comments. We stand ready to assist in those studies should they be initiated.

In light of the magnitude of numerous environmental impacts associated with the proposed Foothills Project and alternative concepts A, B, and C, the Fish and Wildlife Service has recommended to the Bureau of Land Management that the right-of-way permit for the proposed project be denied.

Mitchell G. Sheldon

WILLIAM L. ARMSTRONG
5TH DISTRICT, COLORADO

WASHINGTON OFFICE:
401 CANNON HOUSE OFFICE BUILDING
WASHINGTON, D.C. 20515
(202) 225-4422

0 0086

Congress of the United States
House of Representatives
Washington, D.C. 20515

COLORADO OFFICES:
SUITE #736
1450 SOUTH HAVANA
AURORA, COLORADO 80012
(303) 837-2655

105 CASCADE SQUARE
228 NORTH CASCADE
COLORADO SPRINGS, COLORADO 80903
(303) 634-6071

September 27, 1977

Mr. Stewart A. Wheeler, District Manager
Bureau of Land Management
Canon City District Office
P.O. Box 311
Canon City, Colorado 81212

Dear Mr. Wheeler:

I have reviewed the Draft Environmental Statement on the proposed Foothills Project and am submitting this letter in response to the request for public comment.

The analysis of existing capacity to provide treated water and the population projections for the metropolitan area indicate to me that we must proceed with the Foothills Project.

I particularly wish to comment on the consequences of failing to adequately prepare for the future. As noted in Chapter Eight of the Draft Statement, the effect of insufficient treated water capacity will extend beyond water rationing to economic disruption, employee layoffs and reduced personal incomes. Such a decline in the standard of living enjoyed by families and individuals in the metropolitan Denver area is unnecessary; but, may be the inevitable result of further delay on this already long delayed project.

While I support the Foothills Project, I also believe we must place greater emphasis on urban water conservation and reuse than we have in the past. Drought related conservation measures adopted in Colorado and other parts of the country have demonstrated the possibility of substantial savings. The Foothills Project is only one in a continuing series of decisions we will face on the use of water. The quality of life for everyone in this state depends on our ability to do a better job of conservation.

Best regards.

Sincerely,

Bill Armstrong

William L. Armstrong

WLA:pc

000069

FEDERAL ENERGY REGULATORY COMMISSION

Fort Worth Regional Office
819 Taylor Street
Fort Worth, Texas 76102
October 5, 1977

Bureau of Land Management
Canon City District Office
P. O. Box 311
Canon City, Colorado 81212

Gentlemen:

Furnished herein are our comments on the draft environmental impact statement for the proposed Foothills Project of the Board of Water Commissioners for the City and County of Denver, located in Jefferson and Douglas Counties, Colorado.

The proposal includes a diversion structure, reservoir, tunnel and access roads located about 25 miles southwest of Denver, in the Platte River Canyon. The principal parts of the project include a 125-million gallon per day (mgd) water treatment plant with provision for expansion to 500 mgd capacity and a distribution system extending into the Denver metropolitan area. The South Platte River and the Blue River via Dillon Reservoir and the Harold D. Roberts Tunnel are the sources of water for the project.

These comments are made in accordance with the National Environmental Policy Act of 1969. Our principal concern is the effect the project will have on existing bulk electric power facilities, including potential hydroelectric developments and on natural gas pipeline facilities.

The draft states that the Denver Water Board will possibly install hydroelectric generators which will produce 1,050 to 1,600 kilowatts of electricity at the 125 mgd capacity and 2,200 to 4,700 kilowatts at the 500 mgd capacity. It is noted that the draft states that at 125 mgd capacity the proposed hydroelectric plant would generate 11,000,000 kWh annually and at the 500 mgd capacity generation would be 78,000,000 kWh annually. We believe the latter figure is erroneous since annual energy production of 78,000,000 kWh would require an installed capacity of 8,900 kilowatts operating at 100 percent plant factor (8,760 hours per year). We suggest that these figures be checked with the Board of Water Commissioners' studies. We also note that location of the treatment plant at the Foothills site would result in energy savings of 16,000,000 kWh at 125 mgd capacity level over the present system. Additional savings would occur at the 500 mgd level. We assume that the savings occur annually and are due to the fact that the water supply system for the Denver area will be fed by gravity.

The proposed Strontia Springs Dam will affect two proposed USBR hydroelectric projects, Two Forks and Turkshead. Based on a 1951 USBR report, our inventories of hydroelectric power resources indicate potential capacities of 138,000 kilowatts and 7,200 kilowatts, respectively, for these projects. The Turkshead reservoir, which would be required as an afterbay for the Two Forks project, would be precluded from development by the construction of the Strontia Springs project. The draft report indicates the Strontia Springs project could serve as the afterbay for the Two Forks project, if it should be constructed. Also, the draft indicates the water supply could also be increased by the construction of a dam at the Two Forks site that would be considerably smaller than the project proposed by the USBR.

As noted in our letter of March 12, 1976, on the original draft EIS, the Federal Power Commission, now the Federal Energy Regulatory Commission, is responsible for licensing non-Federal hydroelectric projects which occupy public lands or navigable waters. Projects having more than 2,000 horsepower are licensed as major projects, and those having less than 2,000 horsepower are licensed as minor projects. Both types of licenses are issued for periods of up to 50 years. An application for a license normally must have an environmental impact statement, Exhibit W, submitted as part of the application. In the event that power is installed, it will be necessary to determine what facilities will require licensing.

The opportunity to review the draft statement is appreciated.

Sincerely yours,

Lenard B. Young
Lenard B. Young
Regional Engineer

USDI BLM
Canon City, Colo.
SEP 9 '77
Route Act Info Initial
DM
EP
PL
RM
AO
OP
SLA
RGA
NEA
FILE

Kiwanis Club of Capital City
DENVER, COLORADO
1195 So. York 80210

September 6, 1977

District Manager
Canon City District Office,
Bureau of Land Management
3080 East Main Street
P.O. Box 311
Canon City, Colorado 81212

Dear Sir:

I had attempted to register before September 9, 1977, to speak at a public hearing on the Denver Water Department's planned Foothills Water Treatment Plant on Wednesday, Sept. 14, at Wyer Auditorium in the Denver Public Library. However, on placing a call, I find that all available time has been "spoken" for, so I must submit this written statement.

The long delayed construction of the Foothills Water Treatment Plant has already caused considerable delay in the orderly forward progress of not only the city of Denver, but also of the entire metropolitan area. The cost of the project has more than doubled since the bonds were passed for its construction and any additional delay will only add to the ultimate cost. It is difficult for the long time Denver resident to understand why the acknowledged farsightedness of those responsible for the excellent water systems which have been developed over the years is now suddenly questioned by those who have little or no expertise in the field of water management.

I write to you, not only as a concerned Denver resident, but as the President of a Service Club whose membership is overwhelmingly in support of immediate construction of the Foothills Water Treatment Plant. We ask that the benefits to the entire metropolitan area be weighed against the weak and ineffective argruments put forward by those who would seek to destroy that which it has taken years to build, a safe and effective water system not only for the city of Denver but for the entire metropolitan area which is served by the Denver Water Department.

Sincerely, Lex L. Penix
Lex L. Penix, President

LLP:wj

Denver Jaycees
SUITE 200 1395 WEST ALAMEDA AVENUE DENVER, COLORADO 80223
TELEPHONE 303-777-7878

USDI BLM
Canon City, Colo.
SEP 1 '77

September 1, 1977

District Manager
Canyon City District
Bureau of Land Management
3080 E. Main Street
P.O. Box 311
Canyon City, CO 81212

WE, the Denver Jaycees, wish to indicate our unqualified support for the proposed Foothills Water Project.

Sincerely,

DENVER JAYCEES
James P. Cheevers
James P. Cheevers
President

JC/pek

Metropolitan Chapter/Professional Engineers of Colorado
2751 Alcott St., #166 Denver, Colo. 80211
458-0465

September 15, 1977

EXECUTIVE COMMITTEE
Joe Angyal, P.E.
President
979-1000 (B)
770-3948 (H)
Dick Sittner, P.E.
Vice President
674-4777 (B & H)
Dave Winzer, P.E.
Secretary
988-1360 (B)
333-2955 (H)
Dennis Sandretto, P.E.
Treasurer
371-6470 (B)
377-9979 (H)
Rick Arber, P.E.
Director
371-6470 (B)
333-5525 (H)
Pu Hua Chen, P.E.
Director
744-7105 (B)
343-8049 (H)
Herb Greenwald, P.E.
Director
988-3777 (B)
985-7544 (H)
Matt Jamin, P.E.
Director
979-1000 (B)
771-8176 (H)
Lee Rice, P.E.
Director
455-9569 (B)
934-6589 (H)

District Manager
Bureau of Land Management
Canon City District Office
3080 C. Main Street
P. O. Box 311
Canon City, Colorado 81212

Dear Sir:

The Metropolitan Denver Chapter of the Professional Engineers of Colorado has a membership of 400 practicing engineers from the Metropolitan area. The purposes of our organization are to "encourage technical, educational and ethical advancement" and to "assume our active part in matters of public policy." The Metro Chapter recognizes the importance of an active role from professional organizations such as ours in responding to public issue as important and controversial as the Foothills Project.

The Board of Directors has commissioned me to act in behalf of our organization and write to you in support of the project. It is the viewpoint of our organization that the greater public good is maintained by the implementation of this project. When our society is faced with an enormous problem of effective resources management, this project meets the test of technical, economic, and environmental balance in resources management. The project not only provides a dependable source of treated water supply utilizing state of the art technology but provides electric power as an important by-product of the system. Foothills also represents a reasonable compromise between short term on-site adverse impacts and the quality of life and economic growth and vitality of the greater Denver area.

District Manager, BLM
September 15, 1977
Page two

The delays and resulting escalating costs of not providing the necessary right-of-way permits to construct and operate the Foothills Project is too great a price for society to pay when other necessary projects, social, and environmental programs are so much in need of our scarce resources. We therefore, ask that you grant the necessary rights-of-way to the citizens of Denver to implement this project. The third draft of the environmental statement should be adequate for the determination of granting rights-of-way for less than 50 acres of federal land.

Very truly yours,

Joseph S. Angyal
Joseph S. Angyal
President

cc: Governor Richard Lamm
Congresswoman Patricia Schroeder
Senator Gary Hart
Senator Floyd Haskell
Congressman William Armstrong

Professional Engineers of Colorado

PEC

REPLY TO: 2751 Alcott Street, #166
Denver, Colorado 80211

000467

September 19, 1977

District Manager
Bureau of Land Management
Canon City District Office
2080 E. Main Street
P. O. Box 311
Canon City, Colorado 81212

Dear Sir:

The Professional Engineers of Colorado represent registered professional engineers from all disciplines who reside in the State of Colorado. It is the purpose of this Society to insure that high ethical standards are observed by its members and those who engage in the design and construction of engineering works. The safety and the health of the public are foremost in the minds of conscientious engineers at all times.

For sometime now, the Professional Engineers of Colorado have been watching and studying the proposed and controversial Foothills Project. At the Board Meeting held on September 17th in Colorado Springs, it was the consensus that the Professional Engineers of Colorado should go on record urging the immediate construction of the Foothills Project. As reasonable and conscientious representatives of the engineering community, we are greatly disturbed by the escalating costs resulting from the delays in granting right-of-way permits to construct and operate the Foothills Project.

We, therefore, request that you grant the necessary rights-of-way to the citizens of Denver to implement this Project.

Professionally,

E. Thomas Scherich

E. Thomas Scherich, P.E.
President

ETS/amb

National Society of Professional Engineers

Safari Club International

DENVER CHAPTER

1657 South Sedalia
Aurora, Colorado 80012

DEPT OF INTERIOR
77 SEP 26 AM 10

September 19, 1977

Mr. Dale R. Andrus
State Director
Bureau of Land Management
Denver, Colorado

Dear Mr. Andrus:

The present Bighorn sheep herd residing in the Waterton Canyon in the vicinity of the proposed Strontia Dam-Reservoir-Tunnel will be adversely affected by the construction and subsequent changes in the area. The construction of the diversion dam and resulting reservoir which would replace 1.7 miles of the South Platte River would adversely affect aquatic life, geology, minerals, topography, water quality, terrestrial habitats, and the wild life in the canyon.

The South Platte Canyon is unique to the 400 mile long South Platte River. There is nothing comparable to its entire length. The steep walled enclosed corridor of the river with its narrow floor is physically and visually unique to the South Platte River. The 243 foot high dam and its reservoir would change the character of the landscape from that of a narrow, rugged, relatively undisturbed canyon and free flowing river to that of a man-made dam with its fluctuating pool dominating and altering the existing landscape. The visual impact of poles and telephone lines in the canyon would not enhance the natural beauty.

Bighorn sheep have always been present in the Canyon and are an integral part of the ecology of the area. It is estimated that there are between 35 and 80 bighorn sheep which are year long residents of the canyon. This herd is unique in that it is close to a large metropolitan area and can readily be observed by day hikers and bicyclists at most times of the year. The bighorn sheep summer, winter, and lambing areas have been identified within the canyon in the area of the proposed Strontia Springs Dam. The sheep have been observed to use the area of the proposed dam and access road extensively. The lambing ground exists on the ridge above the proposed left abutement. The bighorn sheep winter and breed in the lower canyon between Cottonwood and Bear gulches, which would be affected by the dam and reservoir.

Construction in the Canyon will result in harrassment, poaching, overcrowding, decreased lamb production and increased susceptibility to disease. The constant harrassment and noise associated with the construction work over a three year period would drive the bighorn sheep out of its present environment and would adversely affect its range. Surrounding areas showed a heavy impact by humans and are not suitable habitat. The loss of its lambing areas, breeding, and wintering ground would probably result in the reduction in herd size and rate of increase. Without suitable lambing, wintering, and breeding range, this herd could become extinct. During the construction of the Platte Canyon intake in the 1960's, the bighorn sheep herd was drastically reduced to approximately 18 animals. This lesser construction which resulted in decimation of the herd would be projected to what would happen with construction of the Strontia Springs Dam and reservoir.

In addition to the bighorn sheep herd observed in the canyon, elk, deer, bear and raptors have been observed in the area. Construction activities over the three year period would drive the elk and deer herd out of its present environment and would adversely affect its range. The present environment for the bear would be completely destroyed. Surrounding areas with residential development are not suitable habitat for the deer and elk herds and completely unacceptable for bear habitat.

The defacement of the canyon and the possible loss of bighorn, elk, and deer herds seem too great a price to pay for a Denver Water Board Project which will only provide water to the Denver area for an additional five years before shortages again will have to be overcome. Such expensive and short term solutions to the water problem perhaps could best be handled with less impact on the environment. At least the Chatfield alternative would result in no construction in the South Platte canyon or affect critical habitat of the elk, deer, bear and bighorn sheep.

If approved for construction, the following mitigating measures should be undertaken by the Denver Water Board:

1. To finance the trapping and transplanting of the elk, deer, bear and bighorn sheep in the canyon for movement to another area. This transplanting should be coordinated with the Department of Wildlife.

2. To finance a study for returning the canyon to wildlife habitat that could sustain deer, elk and bighorn herds at present levels. Wildlife protection and management guidelines will need to be established.

3. To finance the trapping and transplanting of the elk, deer and bighorn sheep herds for return to the canyon.

4. To finance the trapping and permanent transplanting of the bear from the area.

We feel strongly that if you approve the project, the Denver Water Board must be responsible for the welfare of the wildlife in the area.

Your thoughtful consideration of these points in determining your decision will be greatly appreciated.

Yours truly,

David G. Ward
President, Denver Chapter
Safari Club International

DGW:BF

The Mile-Hi Sertoma Club
(CHARTERED SEPTEMBER 8, 1923)
OFFICE OF THE SECRETARY-TREASURER
9300 E. CENTER AVE. #4A • DENVER, COLORADO 80231
TELEPHONE: (303) 344-9838

September 21, 1977

Mr. Steward Wheeler
District Manager
Canon City District Office
Bureau of Land Management
3080 East Main Street
P. O. Box 311
Canon City, Colorado 81212

Dear Mr. Wheeler:

The Mile Hi Sertoma Club of Denver endorses the development of an efficient and continuing water supply as proposed in the Foothills Project.

Mile Hi Sertomans are fully aware that Denver citizens have a long record of assuming financial responsibilities for capital improvement projects. Development of our water supply has always had top priority since the rudiments of the system were acquired in 1918.

At ten separate elections, citizens approved bond issues totaling almost $340,000,000.00. Such ballot box support is overwhelming evidence that Denverites believe in paying their own way to secure a continuing supply of water; their city's most valuable asset.

Generous as they have been with their votes, however, Denver residents expect to see action when they have given appropriate official authority to spend money for public improvements. In the past, prior to the introduction of Environmental Impact Statements, such actions have usually followed shortly after approval of bond issues.

Mile Hi Sertomans - yes all citizens of Denver find it difficult to understand the delays associated with the Foothills Project, which was approved by them nearly four

Meetings, Thursday at 12:10
BROWN PALACE HOTEL
Denver, Colorado

PRESIDENT
REGIS J. COLASANTI
700 ZION STREET
AURORA, COLORADO 80010
CHAIRMAN OF THE BOARD
JAMES W. KNOX
SECRETARY-TREASURER
HARRY R. BREESE

VICE PRESIDENTS
CHARLES W. APPELL
PAUL BILAWSKY
LAWRENCE F. WOOD, JR.
SERGEANT-AT-ARMS
JOHN R. PRITCHARD

DIRECTORS
EDWARD P. BEHLKE
WILLIAM J. CHISHOLM
ROBERT J. DeMASTERS
CHARLES R. HAZLEWOOD
FLOYD A. HOLLAND
PAUL NONOUR
FRED P. NYLANDER

years ago. Many of these citizens join with us in urging quick adoptions of a final Environmental Statement by the Bureau of Land Management and the Interior Department, so we can get on with our continuing efforts to keep our water system efficient, effective and functional.

By locating the site as proposed, the Denver Water Board not only eliminates the need for gigantic pumping facilities as required for Chatfield, but uses gravity flow to substantially reduce the energy needed for the entire Denver Water System.

We, therefore, as members of Mile Hi Sertoma, support the proposed Foothills Project.

Regis J. Colasanti
President

cc: William McNichols
Mayor of Denver

Denver Water Board

RJC/pss

Melody Realty Co.
11031 Sheridan Boulevard
Broomfield, CO 80020
(303) 466-1841

September 23, 1977

Dale Andrus
DIRECTOR, STATE BUREAU OF LAND MANAGEMENT
Department of Interior
1600 Broadway #700
Denver, Colorado 80202

Dear Mr. Andrus:

The Denver Water Board and the citizens of the Denver Metropolitan area have attempted since 1973 to construct the Foothills Water Treatment Plant. We have complied with Federal and State regulations by preparing environmental impact statements on this facility. Yet today it is costing us $23,000.00 per day because of unnecessary federal delays. I would ask that you immediately contact federal officials in charge and demand that they approve the Foothills Project and let us begin this project.

Sincerely,

Barbara Cyborowski

DEPT OF INTERIOR
BUR. LAND MANAGEMENT
'77 SEP 26 AM 10:40

DOUGLAS COUNTY PLANNING AND ZONING
ROOM 203
DOUGLAS COUNTY COURTHOUSE
CASTLE ROCK, COLORADO 80104
Phone 688-4852

SEPTEMBER 30, 1977

000683

'77 OCT 7 AM

DEPT OF INTERIOR

MR. DALE R. ANDRUS
BUREAU OF LAND MANAGEMENT
COLORADO STATE PUBLIC AFFAIRS OFFICE
ROOM 700, COLORADO STATE BANK BLDG.
1600 BROADWAY
DENVER, COLORADO 80202

RE: FOOTHILLS ENVIRONMENTAL STATEMENT

DEAR MR. ANDRUS:

I HAVE REVIEWED THE FOOTHILLS ENVIRONMENTAL STATEMENT AND HAVE THE FOLLOWING COMMENTS.

THE DOCUMENT DOES NOT ADQUATELY DISCUSS THE ENTIRE DENVER WATER BOARD'S SYSTEM. IT IS NEARLY IMPOSSIBLE TO REVIEW ONLY A SMALL PORTION OF THE ENTIRE OPERATION AND BE ABLE TO MAKE WISE DECISIONS. THEREFORE, I WOULD NOT RECOMMEND APPROVAL OF THE FOOTHILLS PROJECT UNTIL AN ADEQUATE ENVIRONMENTAL IMPACT STATEMENT IS PROPOSED ON THE ENTIRE DENVER WATER BOARD SYSTEM. THIS MUST INCLUDE DENVER'S GROWTH CAPABILITIES AS WELL AS THE WATER IMPACTS TO THE ENTIRE STATE.

FINANCIAL IMPACT ON DOUGLAS COUNTY APPEARS TO BE NEGATIVE. THE DENVER WATER BOARD WOULD NOT PAY TAXES TO THE COUNTY EITHER ON THE SITE OR THE FACILITIES. THIS WOULD CAUSE THE COUNTY TAXPAYERS TO PAY THE COSTS OF COUNTY SERVICES - ROAD MAINTENANCE, AND SCHOOLS FOR EMPLOYEE'S CHILDREN LIVING IN THE AREA.

THE SLUDGE DISPOSAL SITES LOCATED IN DOUGLAS COUNTY COULD HAVE NEGATIVE SOCIAL AND FINANCIAL IMPACTS. THE SOLID WASTE SITES HAVE NOT BEEN APPROVED TO MY KNOWLEDGE.

THE FUTURE DENVER SERVICE AREA MAP (1-6) SHOWS MUCH OF DOUGLAS COUNTY BEING SERVED BY THE DENVER WATER BOARD. THE LAST ADOPTED POSITION BY THE DOUGLAS COUNTY PLANNING COMMISSION INDICATED THAT THIS AREA SHOULD BE FOR LOW DENSITY RESIDENTIAL USES. SERVING THE AREA WITH DENVER WATER WOULD CAUSE HIGHER DENSITIES THAN THOSE WHICH HAVE BEEN RECOMMENDED FOR THE AREA. THIS WOULD BE A MAJOR SOCIAL AND ECONOMIC IMPACT ON THE COUNTY.

THE MAJORITY OF THE FOOTHILLS PROJECT IS LOCATED IN DOUGLAS COUNTY, AND I BELIEVE THE DRAFT ENVIRONMENTAL STATEMENT DOES NOT ADEQUATELY ADDRESS THE PRIMARY AND SECONDARY SOCIAL-ECONOMIC IMPACTS THAT WILL OCCUR IN OUR COUNTY AS WELL AS IN THE METRO AREA.

SINCERELY,

Bill Noe

BILL NOE
PLANNING DIRECTOR

BN/NAS

000692

DEPARTMENT OF ENERGY
1075 South Yukon
P.O. Box 26247, Belmar Branch
Lakewood, Colorado 80226

October 11, 1977

Mr. Dale Andrus
State Director
Bureau of Land Management
Room 700, Colorado State Bank Building
1600 Broadway
Denver, Colorado 80202

Dear Mr. Andrus:

The Department of Energy Region VIII environmental staff has reviewed the draft EIS on the Proposed Foothills Project and offers comments on the enclosed attachment.

Overall, it is felt the DES has a good detailed description of the primary and secondary impacts on the environment including the aesthetics, aquatic, and terrestrial ecosystems.

Thank you for the opportunity to comment on this EIS.

Sincerely,

C Dale Eriksen

C. Dale Eriksen
Acting Regional Administrator

Enclosure

ATTACHMENT 1

According to the DES, the Denver Water Board (DWB) has adequate water rights to supply its present system and the proposed Foothills treatment plant at its initial proposed capacity of 125 mgd 1/. Accordingly, DWB's raw water rights total 312,300 acre-feet/year.1/ The DES mentions that the maximum anticipated capacity of the Foothills plant is projected to be 500 mgd.2/ At this anticipated rate, the DWB will require an additional water supply of 93,440 acre-feet per year beyond what the DWB presently has existing rights.3/

The Upper Colorado River Basin Compact of 1948 allocates some 2,976,000 acre-feet/year4/ to Colorado. The 1974 consumption rate was estimated at 2,124,000 acre-feet/year.4/ Based upon these figures, this leaves approximately 825,000 acre-feet/year available for further appropriation.

This figure, at first glance, appears to be substantial but when one considers drought restrictions, increased coal production, potential oil shale development (a million barrel-a-day industry could potentially use 200,000 to 300,000 acre-feet/year depending upon recovery process)5/ and the massive resultant population growths, one can readily see this figure (825,000 acre-feet/year) diminishes quite rapidly if taxed to its maximum.

With this in mind, we pose the following questions regarding the DWB's plans to obtain more water for metropolitan growth:

- Where and how does the DWB plan on obtaining water to meet the Foothills maximum capacity?
- Where and how does the DWB plan on obtaining water supplies to meet the 2,010 projected requirements that total 158,381 acre-feet/year above the figure given as present owned water rights?3/

1/ page 1-19 of the DES (1977)

2/ page 1-8 of the DES (1977)

3/ page 1-17 of the DES (1977)

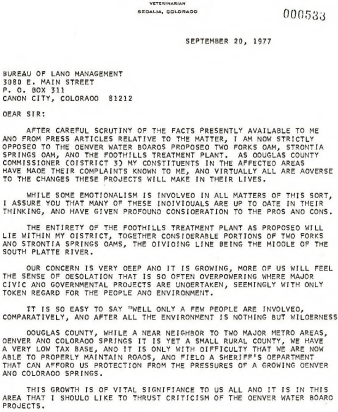
4/ Final EIS, Colony Oil Shale Project, BLM, III-25 and III-26, (1977)

5/ "Guide Book to the Energy Resources of the Piceance Creek Basin," RMAG, page 162 (1974)

We feel that impacts on the economy should have been addressed using various "conservation scenarios" developed in relation to Concepts A-C and/or presented as a new series of options.

Data with appropriate population projections could be shown indicating relationship of potential curtailed supply and potential increases in population, increase in demand for secondary services, and associated increase demand for water, e.g., new households, new industry.

EXAMPLES OF VOTE-TYPE LETTERS



W. G. DUNCAN, D. V. M.
VETERINARIAN
SEDALIA, COLORADO

000533

SEPTEMBER 20, 1977

BUREAU OF LAND MANAGEMENT
3080 E. MAIN STREET
P. O. BOX 311
CANON CITY, COLORADO 81212

DEAR SIR:

AFTER CAREFUL SCRUTINY OF THE FACTS PRESENTLY AVAILABLE TO ME AND FROM PRESS ARTICLES RELATIVE TO THE MATTER, I AM NOW STRICTLY OPPOSED TO THE DENVER WATER BOARDS PROPOSED TWO FORKS DAM, STRONTIA SPRINGS DAM, AND THE FOOTHILLS TREATMENT PLANT. AS DOUGLAS COUNTY COMMISSIONER (DISTRICT 3) MY CONSTITUENTS IN THE AFFECTED AREAS HAVE MADE THEIR COMPLAINTS KNOWN TO ME, AND VIRTUALLY ALL ARE ADVERSE TO THE CHANGES THESE PROJECTS WILL MAKE IN THEIR LIVES.

WHILE SOME EMOTIONALISM IS INVOLVED IN ALL MATTERS OF THIS SORT, I ASSURE YOU THAT MANY OF THESE INDIVIDUALS ARE UP TO DATE IN THEIR THINKING, AND HAVE GIVEN PROFOUND CONSIDERATION TO THE PROS AND CONS.

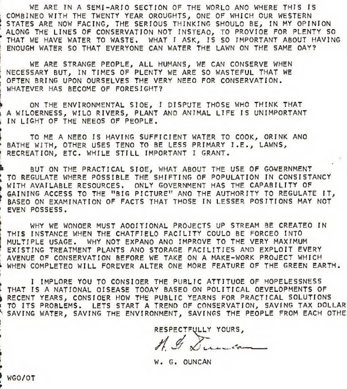
THE ENTIRETY OF THE FOOTHILLS TREATMENT PLANT AS PROPOSED WILL LIE WITHIN MY DISTRICT, TOGETHER CONSIDERABLE PORTIONS OF TWO FORKS AND STRONTIA SPRINGS DAMS, THE DIVIDING LINE BEING THE MIDDLE OF THE SOUTH PLATTE RIVER.

OUR CONCERN IS VERY DEEP AND IT IS GROWING, MORE OF US WILL FEEL THE SENSE OF DESOLATION THAT IS SO OFTEN OVERPOWERING WHERE MAJOR CIVIC AND GOVERNMENTAL PROJECTS ARE UNDERTAKEN, SEEMINGLY WITH ONLY TOKEN REGARD FOR THE PEOPLE AND ENVIRONMENT.

IT IS SO EASY TO SAY "WELL ONLY A FEW PEOPLE ARE INVOLVED, COMPARATIVELY, AND AFTER ALL THE ENVIRONMENT IS NOTHING BUT WILDERNESS".

DOUGLAS COUNTY, WHILE A NEAR NEIGHBOR TO TWO MAJOR METRO AREAS, DENVER AND COLORADO SPRINGS IT IS YET A SMALL RURAL COUNTY, WE HAVE A VERY LOW TAX BASE, AND IT IS ONLY WITH DIFFICULTY THAT WE ARE NOW ABLE TO PROPERLY MAINTAIN ROADS, AND FIELD A SHERIFF'S DEPARTMENT THAT CAN AFFORD US PROTECTION FROM THE PRESSURES OF A GROWING DENVER AND COLORADO SPRINGS.

THIS GROWTH IS OF VITAL SIGNIFIANCE TO US ALL AND IT IS IN THIS AREA THAT I SHOULD LIKE TO THRUST CRITICISM OF THE DENVER WATER BOARD PROJECTS.



WE ARE IN A SEMI-ARID SECTION OF THE WORLD AND WHERE THIS IS COMBINED WITH THE TWENTY YEAR DROUGHTS, ONE OF WHICH OUR WESTERN STATES ARE NOW FACING, THE SERIOUS THINKING SHOULD BE, IN MY OPINION ALONG THE LINES OF CONSERVATION NOT INSTEAD, TO PROVIDE FOR PLENTY SO THAT WE HAVE WATER TO WASTE. WHAT I ASK, IS SO IMPORTANT ABOUT HAVING ENOUGH WATER SO THAT EVERYONE CAN WATER THE LAWN ON THE SAME DAY?

WE ARE STRANGE PEOPLE, ALL HUMANS, WE CAN CONSERVE WHEN NECESSARY BUT, IN TIMES OF PLENTY WE ARE SO WASTEFUL THAT WE OFTEN BRING UPON OURSELVES THE VERY NEED FOR CONSERVATION. WHATEVER HAS BECOME OF FORESIGHT?

ON THE ENVIRONMENTAL SIDE, I DISPUTE THOSE WHO THINK THAT A WILDERNESS, WILD RIVERS, PLANT AND ANIMAL LIFE IS UNIMPORTANT IN LIGHT OF THE NEEDS OF PEOPLE.

TO ME A NEED IS HAVING SUFFICIENT WATER TO COOK, DRINK AND BATHE WITH, OTHER USES TEND TO BE LESS PRIMARY I.E., LAWNS, RECREATION, ETC. WHILE STILL IMPORTANT I GRANT.

BUT ON THE PRACTICAL SIDE, WHAT ABOUT THE USE OF GOVERNMENT TO REGULATE WHERE POSSIBLE THE SHIFTING OF POPULATION IN CONSISTANCY WITH AVAILABLE RESOURCES. ONLY GOVERNMENT HAS THE CAPABILITY OF GAINING ACCESS TO THE "BIG PICTURE" AND THE AUTHORITY TO REGULATE IT, BASED ON EXAMINATION OF FACTS THAT THOSE IN LESSER POSITIONS MAY NOT EVEN POSSESS.

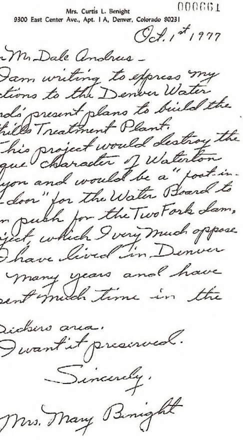
WHY WE WONDER MUST ADDITIONAL PROJECTS UP STREAM BE CREATED IN THIS INSTANCE WHEN THE CHATFIELD FACILITY COULD BE FORCED INTO MULTIPLE USAGE. WHY NOT EXPAND AND IMPROVE TO THE VERY MAXIMUM EXISTING TREATMENT PLANTS AND STORAGE FACILITIES AND EXPLOIT EVERY AVENUE OF CONSERVATION BEFORE WE TAKE ON A MAKE-WORK PROJECT WHICH WHEN COMPLETED WILL FOREVER ALTER ONE MORE FEATURE OF THE GREEN EARTH.

I IMPLORE YOU TO CONSIDER THE PUBLIC ATTITUDE OF HOPELESSNESS THAT IS A NATIONAL DISEASE TODAY BASED ON POLITICAL DEVELOPMENTS OF RECENT YEARS, CONSIDER HOW THE PUBLIC YEARNS FOR PRACTICAL SOLUTIONS TO ITS PROBLEMS. LETS START A TREND OF CONSERVATION, SAVING TAX DOLLARS, SAVING WATER, SAVING THE ENVIRONMENT, SAVINGS THE PEOPLE FROM EACH OTHER.

RESPECTFULLY YOURS,

W. G. DUNCAN

WGD/DT



Mrs. Curtis L. Benight
9300 East Center Ave., Apt. 1 A, Denver, Colorado 80231

000661

Oct. 1st 1977

Dear Mr. Dale Andrus -

I am writing to express my objections to the Denver Water Boards' present plans to build the Foothills Treatment Plant.

This project would destroy the unique character of Waterton Canyon and would be a "foot-in-the-door" for the Water Board to then push for the Two Fork dam, project which I very much oppose.

I have lived in Denver for many years and have spent much time in the Deckers area.

I want it preserved.

Sincerely,

Mrs. Mary Benight

000340

R#2 Box 59B
Sedalia, Colo. 80135
Sept. 10, 1977

BLM Canon City District Office
3080 E Main St. P O Box 311
Canon City, Colo. 81212

Gentlemen:

We wish to object to the Water Board's building of the Foothills Treatment Plant and the Two Forks Dam. There are other alternatives they can use, such as the Chatfield Dam, etc.

We have lived on this river, the South fork of the South Platte, since 1951 in the Scraggy View Addition, are retired and this is our home. We are native Coloradoans, and hate to see country as beautiful as ours and the South Platte Canyon under water with no necessity for it, but the Bureaucratic objective of the Water Board's lust for water and money to sell to other communities around Denver.

Please use your influence to stop this desecration of our beautiful fishing and recreational stream and country. Thanks.

Sincerely and hopefully,

Frances &
Harold Schaele

Mr. & Mrs. Harold W. Schaele
R. 2 Box 59 B
Sedalia, CO 80135

000287

12 September, 1977

Bureau of Land Management
3080 East Main
P.O. BOX 311
Canon City, Colorado 81212

To Bureau Officials:

During the past two weeks, I have had occaision to read the environmental impact statement prepared for the proposed Foothills water treatment plant and to attend a debate between proponent and opponent interests on the decision to build the facility. These recent experiences have confirmed my belief that 1) construction of the treatment plant in itself is an unnecessary addition to an adequate treatment capacity; and 2) construction of the plant as a first phase in an ambitious diversion and reservoir undertaking is unwise at this time.

I am willing to concede that commitments already contracted by the Denver Water Board (DWB) may ultimately justify an enlarged collection system, and therefore, additional treatment capacity. However, before I can support such an expansion I will need to be assured of the following measures:

a) that some of the energies and resources which the DWB now spends on service expansion be diverted to meaningful conservation measures. I am not referring only to outside watering curtailment and a voluntary ban on drinking water in restaurants. I am referring to a pricing mechanism which discourages waste and encourages sensible water use. I am referring also to research into more efficient application of the water we use, and to study of water recycling and land applications of wastewater.

b) that the DWB policy on new taps be thoughtful, realistic, and reflective of the wishes of its present customers. I strongly disagree with the practice of present customers having to finance expansion of facilities and services. I support a periodic and thorough review of policy and practices regarding expansion of service.

I hope you will consider my comments in your decision on the issuance of the necessary permit.

Sincerely,
Mary Pat Wilson

Mary Pat Wilson
4230 East Sixth Avenue
Denver, Colorado 80220

cc/ Denver Water Board
Rep. Patricia Schroeder
Sen. Gary Hart
Sen. Floyd Haskell

Box 280, Woodland Pk
Co 80863 9/13

Dear Sirs:

I believe that building the Foothills Treatment Plant and Strontia Springs dam are first steps toward eventual ruin of The entire Platte River area around Deckers and suggest you find an alternative less drastic.

Sincerely, N. Hayes (Mrs. J.F.)

000534

450 S. Lewis St.
Lakewood, CO 80226
September 22, 1977

BLM
Canon City, CO 81212

Gentlemen:

After attending two sessions of the public hearings on Foothills we are more firmly resolved that the plant should not be built.

Mr. Brannan's statement is evidence of the DWB's "shallow" thinking on the conservation of water use. He considers any water not used right now as being wasted;"depriving people of their property" as he stated. We feel the DWB is depriving people of their property in Waterton Canyon, that is free-flowing water, with their plans for Foothills and Two Forks.

We are not frightened by predictions of permanent water restrictions. We welcome them. In fact we have heard no opposition from our neighbors and friends this summer. Metro Denver does not look any less green this year. We would applaud a high peak-demand water rate. We welcome the cost of installing meters as opposed to the DWB's refusal of $4 million.

We agree with the specific evidence presented citing the lack of meed of Foothills and the fact that it will be obsolete without increased water supply. We do not believe that Foothills will not be used in trying to railroad through Two Forks Dam. We believe the entire water plans of the DWB should be included in the EIS. The EIS should be done on a regional basis becausw of possible future additional transmountain diversions.

The poll taken by Robert Tonsing is not valid without giving the respondents a more thourough explanations of Denver's water situation. We believe the poll was prejudiced by the statement given which indicated a definite future water shortage which is not true at this time if conservation and restrictions were implemented.

We urge you to reject the DES until a more appropriate overall plan for metro Denver water needs is formulated. We must be more innovative in the way we use water in this arid region. Thank you.

September 16, 1977

District Manager,
Canon City District Office,
Bureau of Land Management,
Post Office Box 311,
Canon City, Colorado 81212

Gentlemen:

Re: Foothills Project

The Board of Water Commissioners of the City and County of Denver plans to construct, operate and maintain water diversion facilities involving a small amount of federally managed lands on the South Platte River in Douglas and Jefferson Counties approximately 25 miles southwest of Denver, Colorado, as a part of the proposed Foothills project. The planned project includes a dam and small reservoir, a tunnel, a water treatment plant with an ultimate capacity of 500 million gallons of treated water per day, and a conduit distribution system extending into the Metropolitan Area. The proposed facility will provide adequate municipal and industrial water for the Metropolitan Denver Region, until some time after the year 2000.

Please be advised that the Board of Directors for the Green Mountain Park Water and Sanitation District which serves unanimously approximately 25,000 to 30,000 people believes the Foothills Project should be built as planned by the Board of Water Commissioners for the City and County of Denver. The Denver Water Department has long demonstrated its excellent ability to plan, develop and efficiently manage and administer the municipal water supply function entrusted to them. The current project, Foothills, is but one example of the ability of the Denver Water Department to perceive the need; plan; and provide for facilities required to furnish an adequate supply of water needed to maintain the standard of living and economy of the Metropolitan region which they are capable of serving.

A review of the recently completed Environmental Impact Statement for the Foothills project clearly demonstrates the need for the immediate commencement of construction of this project. The Environmental Impact Statement also clearly reveals that the need for the project far surpasses and outweighs the minor negative environmental impacts which are envisioned. The direct impact on the health, safety, economy and environment of two thirds of the people of Colorado, both now and in the future, will be adverse to an extreme degree if the Foothills water treatment plant is not constructed.

Adverse sociological and economic impacts will also be felt by the remainder of the citizens of Colorado through secondary effects resulting from further delay of this project.

The Colorado Public Expenditures Council, a private research group, has recently made the following recommendations for actions to be taken to help alleviate the expected and predictable extreme shortage of water:

1. An immediate start on capital projects to blunt the ravaging effects of future inflationary pressures.
2. Construction of additional water treatment and distribution facilities.
3. Construction of dams and reservoirs to control and retain water lost in periods of high runoff.
4. Development of technology to allow economic recycling of water.
5. Consolidation of duplicative supply, treatment and distribution facilities into a regional agency.
6. Resolution of emerging regional, state and national differences in western water policy.

It is estimated by the Colorado Public Expenditures Council that 2.4 million people will reside in the Front Range metropolitan area surrounding Denver by the year 2000, as compared to approximately 1.7 million people by 1978. The anticipated growth, 600,000 to 700,000 people in less than twenty-five years, will occur regardless of whether or not there are sufficient water supplies to support such growth. Experience and research clearly show that the availability of adequate water supplies in a given region has little or no effect on the rate of growth of population in that region.

Please be assured that I understand the importance of the Foothills Project to the Metropolitan Denver residents and the people of the State of Colorado as a whole. I request that you consider the action of the Denver Regional Council of Governments by their adoption of a formal resolution in support of the Foothills Project as planned by the Board of Water Commissioners for the City and County of Denver, and the official endorsement of the Foothills Project by the counties of Adams, Arapahoe, Denver, and Jefferson, and the municipalities of Aurora, Broomfield, Cherry Hills Village, Columbine, Glendale, Greenwood Village, Lakewood, Littleton, Sheridan, Thornton, Westminster, and others, as the mandate of some 1,400,000 to 1,600,000 citizens presently residing in the Metropolitan Denver Region for the commencement of the immediate construction of the Foothills Project in accordance with the plans proposed by the Denver Board of Water Commissioners for the eventual 500 millions gallons per day water treatment capacity. I further request that the officials of the Bureau of Land Management and other federal agencies involved cooperate with the staff and officials of the actions necessary to permit the immediate commencement of construction of this project

which has been clearly demonstrated through the development of the Environmental Impact Statement to be in the best interest of the majority of the citizens of the State of Colorado.

Sincerely yours,

Keith J. Kroneberger

KEITH J. KRONEBERGER

KJK:hc

September 23, 1977

District Manager
Bureau of Land Management
Canon City District Office
P. O. Box 311
Canon City, Colo. 81212

Re: Draft Environmental Statement
Proposed Foothills Project

Dear Sir:

The Draft Environmental Statement for the proposed Foothills Project has been reviewed and is considered adequate in addressing the environmental impacts of the project. While recognizing that not all possible questions can be answered in complete detail to the satisfaction of all concerned, it is our opinion that the draft statement provides the basis for approving the proposed action.

We believe the project as proposed is preferable to any of the alternatives discussed in the Draft Statement. Further delay of the project will serve no useful purpose and will result in higher cost.

Thank you for the opportunity to comment.

Very truly yours,

Linda Mason

cc U.S. Senator Floyd Haskell
U.S. Senator Gary Hart
Congresswoman Pat Schroeder
Congressman Tim Wirth
Governor Richard D. Lamm
Cecil D. Andrus
Bob S. Bergland

10955 Linda Vista Dr.
Denver, Co. 80215
Sept. 26, 1977

District Manager, Canon City Office
U.S. Bureau of Land Management
P.O. Box 311
Canon City, Co. 81212

000581

Dear Sir:

I am writing on the subject of the "Proposed Foothills Project" as presented in your DES of Aug. 1977.

I am against construction of the project and of the alternatives you present in Chapter 8, I consider "NO Action" as the best decision. I interpret "No Action" as the denial of the right-of-way application and leaving it to the DWB to institute various other types of action to deal with the problem of providing an adequate water supply for its constituents.

I do not think it is in the best interests of the citizens of this state to build Two Forks Reservoir and reduce the flow of some 70 high mountain streams in the Eagle-Piney drainage area by 85% in order to fill the reservoir. Streams of crystal clear water flowing in mountainous and forested terrain is what I consider the heart of the Colorado Rockies. I also believe this is the way the state is conceived by the people of the United States who come or hope to come to visit its scenic marvels. Although the DWB is confining its public statements to Foothills, there is no doubt it is condidering it as only the foot in the door to their multi-million dollar goal of a new transmountain collection and water diversion project with Two Forks as the necessary storage component. Without increased raw water sources, Foothills would be a boondoggle in providing increased treated water.

In the absence of a Foothills treatment plant, the DWB would be forced to take action along lines suggested by your discussion. These include water rationing-education program, public awareness, universal metering(including rate structure changes which escalate after basic use standards are met), building codes, local storage, and system improvements. In addition, recycling(proving successful in Grand Junction for irrigation) and installations which will put the Moffat Filter Plant into full production should be considered. The Moffat Filter Plant has been operating at about 50% capacity this summer due to a shortage of water in Gross Reservoir. Raw water could be piped from the South Platte area to Moffat and increase treatment capacity by 100 mgd. Eventually it might be necessary to enlarge Gross Reservoir and collect more water from the Williams Fork and Fraser installations. In my opinion all of these things should be attempted before the Foothills-Two Forks-Eagle Piney project should be licensed.

In the deliberations carried out in making your decision on Foothills, I hope you will not give too much weight to the successful $160,000,000 water bond issue passed by the Denver voters in 1973. As was pointed out on p. 2-10 of the DES the total vote was only 24% and of those who voted, the issue passed with only 54% of the vote. This was a very questionable victory considering that the pro-bond organization outspent the opposition by better than 5 to 1 on the campaign. In addition it had the full backing of Denver's largest newspaper and used distortions and DWB threats of massive increases in water rates if the bonds were not voted.

Judging from the witnesses who were scheduled to testify at the Sept. 14,15,16 hearings, I would conclude that those speaking for the Foothills project were primarily repreesenting the DWB, the constructuon industry, banks, realtors, chamber of commerce, and local government units. The local government officials undoubtedly prefer obtaining new sources of water to trying to enforce conservation measures since the negative impacts would fall primarily on persons outside the service area rather than on their constituents. May I suggest that the other categories mentioned would stand to gain substantial financial advantages from a greatly increased water supply. The DWB itself consists of 4 businessmen and a lawyer who has a long history advocating transmountain diversions.

The present drive for "Foothills Now" is similar to the 1973 campaign for the water bonds. The Denver Water B oard is an uncompromising arrogant group which will consider no changes in its structural plan and charges those who are interested in a conservation approach as being guilty of"ignorance and shallow thinking". Along with the "Water for Colorado" group they are using half-truths, omissions, and distortion tactics. Examples of these are(1) DWB told the public that lack of treatment was the only reason for water rationing this summer but omitted the fact that lack of water was permitting only a 50% capacity treatment at the Moffat Filter Plant(2)DWB does not discuss its grandiose plan of Two Forks and the Eagle-Piney as the inevitable sequel to a Foothills (3)A "Water for Colorado" enclosure in all Consolidated Mutual Water Co. customers' bills for August credited the DES with the position that the the 1.7 miles of trout stream that would be buried by the Foothills Reservoir would be replaced by the creation of a new lake fishing recreational resource. I read carefully pp.3-23,24,25 of the DES and could find no such statement.In fact , the DWB has always, and rightfully so, prohibited fishing and other recreation in Cheesman and Marston lakes and would undoubtedly do so at Foothills. Please consider their tactics and motives in evaluation their testimony.

I believe the time has come to turn around the frontier ethic of exploiting natural resources to their limits and to give stature to a conservation ethic. I also believe that the U.S. government is leaning toward this point of view and suggest that it be applied in the rejection of the Foothills permit at this time.

Sincerely yours,

Edward Morey

000582

September 14, 1977

District Manager
Bureau of Land Management
Canon City, District Office
3080 East Main Street
P. O. Box 311
Canon City, Colorado 81212

Gentlemen:

Re: BUILD FOOTHILLS!!!

Planning and construction of the Foothills Project is necessary to assure the continued availability of the West's most precious natural resource.

Finalization of the Environmental Statement on this project and subsequent approval of the plan by Federal officials would be deeply appreciated by me and tens of thousands of other Denver area residents.

This past summer only shows what the future will bring if the Foothills Project is not carried through.

Sincerely,

Nancy L. Dillon

Nancy L. Dillon

UNITED ASSOCIATION of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada

Journeymen Plumbers ~~and~~ & Gas Fitters Local Union 3
360 ACOMA STREET, ROOM 210
DENVER, COLORADO 80223

000232

September 6, 1977

District Manager
Bureau of Land Management
Canon City District Office
3080 East Main St.
P.O. Box 311
Canon City, Colorado 81212

Dear Sir:

Plumbers Local Union No. 3, who's membership numbers eight hundred and fifty, has recently voted unanimously to support the Denver Water Board's proposal for construction of the Foothills Water Treatment Plant.

We urge your support of this project.

Very truly yours,

Paul E Emrick
Paul E. Emrick
Business Manager

PEE/nt
opeiu-5
afl-cio

DOWN TOWN DENVER US★
DOWNTOWN DENVER, INC.
704 GUARANTY BANK BLDG.
DENVER, COLORADO 80202
TELEPHONE 303/534-6161

000532

September 22, 1977

District Manager
Canon City District Office
Bureau of Land Management
3080 East Main Street
P.O. Box 311
Canon City, Colorado 81212

Gentlemen,

The Executive Committee of Downtown Denver Inc., a 300-member business oriented downtown supported group of major banks, retailers, S&L's, hotels, restaurants and many smaller businesses - recommends to your consideration the planned Foothills Water Treatment Plans of the Denver Water Department.

A review of the years of planning; the approval by a vote of the people of Denver; the unbiased need for water for this fast developing area of Colorado; all indicate to us the unequivocal backing of this organization is both necessary and important to the sensible and demanded growth in the Denver Metro area.

We therefore add the voice of Downtown Denver Inc. to the many other vital organizations interested and involved in our future.

Very truly yours,

Philip Milstein
Philip Milstein
Executive Vice President

PM/mg

000370

TRIPLE C DEVELOPMENT CORPORATION
6610 WEST 14TH AVENUE, LAKEWOOD, COLORADO 80214 • (303) 233-4320

Sept. 15, 1977

Dale Andrus
Director State Bureau Land Mangement
Department of Interior
Colorado State Bldg. #700
1600 Broadway
Denver, Colorado 80202

Dear Mr. Andrus:

I need your help. I know that I do not understand all of the details necessary to approve something like the Foothills Water Treatment Plant. However, as a private business man I do understand the decision making process and from what I have read and heard, I believe that the Federal decision making process here is subject to a great deal of criticism. As a businessman, I question any process which costs $23,000 a day in increased cost. I would ask you to take immediate action to see that the Foothills Water Treatment Project is approved and construction begun. Your help in this area will greatly influence my attitude about the effectiveness and efficiency of the Federal Government in the future.

Sincerely,

Steph Crout
Stephen W. Crout
Broker

pw

000253

city of
SHERIDAN

September 8, 1977

District Manager
Bureau of Land Management
Canon City District Office
3080 E. Main St.
P.O. Box 311
Canon City, CO 81212

Gentlemen:

The Mayor and City Council of the City of Sheridan support the construction of the foothills project.

Respectfully,

Wilfred D. Corbin
Wilfred D. Corbin
Mayor

WDC/blh

cc: Mr. Frank Thurston, Public Relations
Denver Water Commissioners
144 W. Colfax Ave.
Denver, CO 80203

4400 SOUTH FEDERAL BOULEVARD • ENGLEWOOD, COLORADO 80110 • (303) 795-3416

000678

Denver Jaycees
YOUNG MEN OF ACTION

DATE: Sept 30 77

I, Samuel W Green, am strongly in favor of the proposed Foothills Water Project.
SAMUEL W GREEN

SIGNED: Samuel W Green

000669

Dale Andrus
Director State Bureau Land Management
Department of Interior
Colorado State Bldg. #700
1600 Broadway
Denver, Colorado 80202

Dear Mr. Andrus,

I need your help. I know that I do not underetand all of the details necessary to approve something like the Foothills Water Treatment Plant. However, as a private business man I do understand the decision making process and from what I have read and heard, I believe that the federal decision making process here is subject to a great deal of criticism. As a businessman, I question any process which costs $23,000 a day in increased cost. I would ask you to take immediate action to see that the Foothills Water Treatment Project is approved and construction begun. Your help in this area will greatly influence my attitude about the effectiveness and efficiency of the Federal Government in the future.

Sincerely,

Ross E. Ager

September 30, 1977

Dale Andrus
Director, State Bureau of Land Management
Department of Interior
1600 Broadway #700
Denver, Colorado 80202

To Whom it May Concern:

The Foothills Water Treatment Project is important to me personally. The lifestyle that I have tried to create for myself and my family is being interfered with by the lack of decision making capabilities on the park of federal officals. You as a federal offical have an obligation to see that this unnecessary bureaucratic holdup of the Foothill Project stops now. Your delay in the construction of the Foothill Water Treatment Project has already cost the citizens of the Denver Metropolitan area and therefore me, $65,000.00. This delay is unacceptable and I would hope that you would take immediate action to see that this project is approved.

Thank you,

Greg Reinhardt
Sales Associate
Michael Shinn & Associates

City of brighton

September 22, 1977

District Manager, BLM
Canon City District Office
3080 E. Main St.
P.O. Box 311
Canon City, CO 81212

Gentlemen:

As a neighboring suburb we wish to support the Denver Water Board in its longstanding efforts to build the Foothills Treatment Plant.

In the past, the Denver Water Board has been criticized for not incorporating hydroelectric power in its reservoir developments.

The proposed Foothills Project would contain facilities capable of generating not only sufficient electric power to operate the plant, but would provide a surplus for public use. A minimum of three million kilowatt hours annually would be available for purchase by private utilities.

The creation of this new pollution-free energy source would be sufficient reason alone for approval and construction of Foothills. The Draft Environmental Statement, however, descrives numerous other positive factors that support development of this project.

Please act favorably toward Denver's construction plans.

Yours truly,

Gary Gilpin
Mayor Pro Tem

22 south 4th avenue, brighton, co. 80601 (303) 659-4050

LITERATURE AND INFORMATION SOURCES CITED

LITERATURE AND INFORMATION SOURCES CITED

Air Pollution Control Act. 42 U.S. Code 1857 et seq. (1964), Act of July 14, 1955, ch. 360, 69 stat. 322.

An Act to Amend the Act of June 27, 1960 (74 Stat. 220), Relating to the Preservation of Historical and Archeological Data. Historical and Archeological Preservation Act of 1974. Statutes at Large, vol. 88, 1974.

An Act to Establish a Program for the Preservation of Additional Historic Properties Throughout the Nation, and for Other Purposes. National Historic Preservation Act of 1966. 16 U.S. C. 470 (f), Statutes at Large, vol. 80, 1966.

Anderson, Price and Delivery of Water in Northern Colorado Front Range. Natural Resource Economics Division, Economic Research Services, USDA, 1974.

Andrus, Dale R., Bureau of Land Management, Colorado State Office, to Robert N. Ridings, Forest Supervisor, U.S. Forest Service, Denver. L.S. Central Files, BLM/CSO, Denver, Colorado, April 1975.

Armstrong, D. M. Distribution of Mammals in Colorado. University of Kansas Museum of Natural History monograph 3:i-x and 1-415, Lawrence, Kansas, 1972.

Bald Eagle Protection Act, 16 U.S. Code (1964), ch. 278, Act of June 8, 1940 par. 668 et seq., ch. 278, 54 stat. 250, 1964.

Barrows, Peter. Colorado Department of Natural Resources, Division of Wildlife, Denver, Colorado. Interview of March 19, 1975.

Black and Veatch, Consulting Engineers. Report on Comprehensive Water System Study for the Board of Water Commissioners, City and County of Denver, transmitted from T. B. Robinson to the Denver Water Board, Denver, Colorado, April 1973.

Board of Water Commissioners, City and County of Denver. Foothills Project Predesign Report, vol. I and II, Denver, Colorado, 1973.

Board of Water Commissioners, City and County of Denver, to Barry Cushing, Environmental Impact Statement Team, BLM, L.S. Case File, Central Files, BLM/CSO, Denver, Colorado 1975.

Boeker, Ervin L. and Thomas D. Ray, "Golden Eagle Population Studies in the Southwest." Condor 73 (4): 463-467, 1971.

Brannan, Charles F. Public Meeting, Universal Metering in Denver. Remarks to Denver City Council, Denver City Council Chambers, Denver, Colorado, September 29, 1977.

Breternitz, Dr. David A., University of Colorado, Boulder, Colorado. Interview of March 14, 1975.

Bryson, Samuel, A Report on the Evaluation of Universal Metering in Denver Colorado, University of Colorado, Boulder, Colorado, 1974.

Carley, Robert L. Waste Water Reuse and Public Opinion. Masters Thesis, Department of Civic and Environmental Engineering, University of Colorado, Boulder, Colorado 1973.

Cary, M. "A Biological Survey of Colorado." North American Fauna 33:1-256, 1911.

CH_2M Hill. Preliminary Evaluation of Expanding Williams Fork Water Diversion System. Report prepared for the Denver Board of Water Commissioners (Technical Report, 3 Vols. and Environmental Assessment, 1 Vol.). Project No. D8715.0. Denver, Colorado, 1976.

CH_2M Hill. Environmental Evaluation of Completing Williams Fork Water Diversion System for the Denver Board of Water Commissioners. Denver, Colorado, September 1976.

City and County of Denver, Annual Report, 1973, Metropolitan Denver Sewage Disposal District No. 1, Denver, Colorado, June 1974.

Clawson, M. and Knetsch, J. Economics of Outdoor Recreation. Resources for the Future, Inc. - John Hopkins Press, Baltimore, 1966.

Clean Air Act of 1970. 42 U.S. C. 1857 et seq.; P.L. 91-604, December 31, 1970.

Colorado Department of Education. Salaries and Related Information for Certified Personnel. Denver, Colorado, 1974.

Colorado Department of Education. Consolidated Report on Elementary and Secondary Education in Colorado. Denver, Colorado, 1975.

Colorado Department of Health, Air Pollution Control Division, Analysis of Air Quality in the Denver Air Quality Maintenance Area, Denver, Colorado, March 1977.

Colorado Department of Health, Air Pollution Control Division Memorandum, "Foothills DEIS", Denver, Colorado, September 1977.

Colorado Department of Health, Water Quality Control Division. Water Quality Standards and Stream Classification. Denver, Colorado 1974.

Colorado Division of Highways, Traffic Investigations Section. "Preliminary Annual Average Daily Traffic Volume, 1975." Unpublished.

Colorado Division of Housing. Housing in Colorado, Current Inventory and Needs, Statistical Supplement, Denver, Colorado, April 1976.

Colorado Department of Labor and Employment, Division of Employment, Colorado Manpower Review, edited by David Larson. Denver, Colorado, 1974, 1976.

Colorado Geological Survey. Guidelines and Criteria for Identification and Land-use Controls of Geologic Hazard and Mineral Resource Areas, by W. P. Rogers, L. R. Ladwig, A. L. Hornbaker, S. D. Schwockow, S. S. Hart, D. C. Shelton, D. L. Scroggs, and J. M. Soule. Special Publication No. 6, Colorado Geological Survey, Denver, Colorado 1974.

Colorado Land Use Commission. Sediment Yield, Denver, Colorado, January, 1974.

Colorado Department of Natural Resources, Division of Wildlife, Fryingpan-Arkansas Fish Research Investigations, Project Report No. 1, by L. M. Finnell, Denver, Colorado, 1972.

Colorado Department of Natural Resources, Division of Wildlife. Fryingpan-Arkansas Fish Research Investigations, Project Report No. 3, by L. M. Finnell and G. L. Bennett, Denver, Colorado, 1974a.

Colorado Department of Natural Resources, Division of Wildlife. Special Regulations and Elimination of Stocking Influence on Fishermen and the Trout Populations at the Cache La Poudre, by Wm. D. Klein. Colorado Technical Publication No. 30. Denver, Colorado, 1974b.

Colorado Department of Natural Resources, Division of Wildlife. Various unpublished stream surveys. Denver, Colorado. Undated.

Colorado Department of Natural Resources, Division of Wildlife. "Draft Report on Endangered Species." Denver, Colorado, 1976.

Colorado Division of Parks and Outdoor Recreation. Colorado Comprehensive Outdoor Recreation Plan. Colorado Division of Parks and Outdoor Recreation, Denver, Colorado, 1976.

Colorado Revised Statutes, 1973, Title 24, Article 80, Parts 4 and 5.

Colorado Revised Statutes, 1973, Title 33, Wildlife and Parks and Outdoor Recreation.

Cooley, Marcus R. U.S. Department of the Interior, Bureau of Reclamation. Salt Lake City, Utah. Interview of March 14, 1975.

Corps of Engineers. *Draft Environmental Impact Statement for Chatfield Lake*. Omaha, Nebraska, 1974.

Council on Environmental Quality. *Recreation on Water Supply Reservoir - A Handbook for Increased Use*. Government Printing Office, Washington, D. C., September 1975.

Craig, Jerry, Colorado Department of Natural Resources, Division of Wildlife, Denver, Colorado. Personal communication, February 1975.

Danbom, Dan. Public Service Company of Colorado. Private communication, 1974.

DeDeker, Donald. Executive Director, DRCOG. Foothills DES Public Hearings. Transcript, Volume II, P. 77.

Denver Board of Water Commissioners. *Environmental Report Pertaining to Alterations at Gross Dam and Reservoir, Supplement to Application for License Amendment*, Denver, Colorado, 1976.

Denver Board of Water Commissioners, *Annual Statistical Report*, Denver, Colorado, 1973.

Denver Post, Wednesday, February 19, 1975, Sec. D., p. 39, Denver, Colorado.

Denver Regional Council of Governments. *Annual Report* on Regional Growth and Development. Denver, Colorado, July 1977.

Denver Regional Council of Government. *1970 Parks and Recreation Open Space Development Program*. Denver SMSA Supplement. Denver, Colorado, January 1973.

Denver Regional Council of Governments, "Telephone Survey," Internal Preliminary Draft Copy, Denver, Colorado, 1974a.

Denver Regional Council of Governments. *Comprehensive Health Plan for Denver Area-Wide Health Planning Region III*, Denver, Colorado, May 1974b.

Denver Regional Council of Governments. *COG-notations*, Denver, Colorado, January 1974c.

Denver Regional Council of Governments. *Capsule of a Region*, Denver, Colorado, 1975a.

Denver Regional Council of Governments. *Comprehensive Health Plan for Region III, Data Base*. Denver, Colorado, February 1975b.

Denver Regional Council of Governments. "Fire Protection Survey." Unpublished draft.

Denver Regional Council of Governments. "Criteria for the Specification of Prime Agricultural Lands," by Gail Hill. Unpublished.

Denver Regional Council of Governments. "Agricultural Land Use in the Denver Region," by Gail Hill. Unpublished.

Denver Regional Council of Governments. "Bibliography for Prime Agricultural Lands," by Gail Hill. Unpublished.

Denver Research Institute. Reducing Municipal Water Demand July 1977.

Denver Water Board. Environmental Assessment: Foothills Project, Vol. I and Appendices. Denver, Colorado, April 1974.

Denver Water Board. Water Quality Report. Denver Water Department, Denver, Colorado, 1973, 1974, 1975, 1976.

Denver Water Board. Annual Reports. Denver, Colorado, 1973, 1974, 1975.

Denver Water Board. Comments to BLM on Foothills DES, September 23, 1977.

Ecological Analysts, Inc. South Platte North Fork: An Environmental Assessment, Boulder, Colorado, 1974.

Emrick, Cynthia and Frank W. Eddy. Archaeological Investigations for the Two Forks Dam and Reservoir Alternative, Colorado: Fourth Progress Report and Recommendations for Mitigation of Historical Resources, National Park Service Contract No. CX-1595-4B-038 (formerly CX-1200-4B-038), Boulder, Colorado, 1976.

Emrick, Cynthia, The State Historical Society of Colorado, to Dale R. Andrus, Bureau of Land Management, Colorado State Office, Denver. Letter of December 6, 1974. L.S. Central Files, BLM/CSO Denver, Colorado.

Emrick, Cynthia, The State Historical Society of Colorado, to Dale R. Andrus, Bureau of Land Management, Colorado State Office, Denver. Letter of March 13, 1975. L.S. 2pp. Central Files, BLM/CSO, Denver, Colorado.

Emrick, Cynthia, The State Historical Society of Colorado, Denver, Colorado. Interview of March 31, 1975.

Endangered Species Act of 1973. 16 U.S. Code 1531 (1970) et seq. Act of December 28, 1973. P.L. 93-205, 87 Stat. 884.

Erman, D. C. "Upstream Changes in Fish Populations Following Impoundment of Sagehen Creek, California." Trans. Amer. Fish. Soc. 102(3):626-629, July 1973.

Executive Order 11593. "Protection and Enhancement of the Cultural Environment." 36 Fed. Reg. 95, May 1971.

Federal Water Pollution Control Act Amendments of 1972. 33 U.S. Code 1151 et seq. (1970). Act of October 18, 1972, P.L. 92-500, 86 Stat. 816.

Feldman, Joel, An Excursion up the South Platte Canyon - An Informal History of the South Platte Canyon From Kassler to the Town of South Platte, Denver Board of Water Commissioners, Denver, Colorado, 1976.

Fenneman, U.M. Physiography of Western United States. McGraw Hill, New York, N.Y., 1931.

Field, D. R., J.C. Barron, and B. F. Long. Water and Community Development -- Social and Economic Perspectives. Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan, 1974.

Fish and Wildlife Coordination Act. 16 U.S. Code § 661 et seq. (1964). Act of March 10, 1934, d. 55, 48 Stat. 401 as amended.

Fish Conservation Act. 16 U.S. Code §§ 757a-757f (1970), Act of October 10, 1965. P.L. 89-304, 79 Stat. 1125.

Flack, J. Ernest, Samuel G. Bryson, and Robert McWhinnie. Urban Water Conservation: A Case Study of Denver, Colorado. University of Colorado, Boulder, Colorado, September 1974.

Flack, J. Ernest, Director, Center for Urban Engineering Studies and Professor, Department of Civil and Environmental Engineering, University of Colorado. Private communication, 1975.

Flack, J. Ernest, A Report on the Evaluation of Universal Metering in Denver, Colorado. University of Colorado, Boulder, Colorado 1974.

Ford, J. "Fluctuations in Natural Populations of Collumbola and Acarina." J. Animal Ecology. 6(1):98-111, 1937.

4-C Company, A Survey of Citizen Attitudes in Colorado, September 1977.

Frankhouser, Jake. Personal Communications, Denver, Colorado 1977.

Ganfin, A. R. "Use of Aquatic Invertebrates in the Assessment of Water Quality." Biological Methods for the Assessment of Water Quality. ASTM STP 528, American Soc. for Testing and Materials, 1973.

Gary, M. R. McAfee, Jr. and D. L. Wolf, editors. Glossary of Geology. American Geological Institute, Washington, D. C., 1972.

Gerace, Michael and Gary Reeves, Public Service Company of Colorado, Information Department. Private Communication, 1974.

Green, Wm. E. A Feasibility Study of Universal Metering in Denver, M.S. Thesis, Department of Civil and Environmental Engineering, University of Colorado, Boulder, Colorado, 1972.

Henry, Thomas. Colorado Department of Natural Resources, Division of Wildlife, Evergreen, Colorado. Personal communication, February 1975.

Hibbert, John. Private communication, 1977.

Hibler, Charles P. "Some Observations on the Epidemiology of the Lungworm Pneumonia Complex in Bighorn Sheep in Colorado." Unpublished. Colorado State University, 1972.

Hunsaker, Gene, Mountain Bell Telephone Company. Private communication. 1974.

Hunt, R. L. Responses of a Brook Trout Population to Habitat Development in Lawrence Creek. Technical Bulletin No. 48. Wisconsin Department of Natural Resources, Madison, Wisconsin, 1971.

Insurance Services Office of Colorado-Wyoming. Town Index: Colorado-Wyoming September 1975, Denver, Colorado, 1975.

Irwin-Williams, Cynthia and J.J. Irwin. Excavations at Magic Mountain. Denver Museum of Natural History, Denver, Colorado, Proceedings No. 12, 1966.

John Hopkins University, Differences Between Metering and Flat Rate Usage, 1961.

Jones, C. C. and R. E. Jones. "Bighorns - Or Water?" Colorado Outdoors. 26(1):33-36, 1977.

Jones, R. E. and E. E. Jones. "The Bighorn Sheep of the South Platte Canyon: Final Summary and Conclusion." Foothills Ecology Project. Unpublished, 1974.

Kelly, Tim. Official Colorado & Wyoming Fishing and Hunting Guide. Edited by Jim Rominger. Broomfield, Colorado, 1975.

Kelly, Tim. Official 1975-76 Colorado-Wyoming Fishing and Camping Guide. Edited by Dee J. Carter, Recreation Publications, Denver, Colorado, 1976.

Kern, George. Private communication, 1977.

Kirkham, Robert, Private communication, 1977.

Krynine, D. P. and W. R. Judd. Principles of Engineering Geology and Geotechnics. McGraw-Hill Book Co., New York, N.Y., 1957.

Lechleitner, R. R. Wild Mammals of Colorado: Their Appearance, Habits, Distribution and Abundance. Pruett Publishing Co., Boulder, Colorado, 1969.

Linaweaver, T. P., Jr., John C. Geyer, and Jerome B. Wolff. Final and Summary Report of the Residential Water Use Research Project. The John Hopkins University, Baltimore, Maryland, 1966.

Marr, J. W. Ecosystems of the East Slope of the Front Range in Colorado. University of Colorado Press. Boulder, Colorado, 1967.

Martin, Curtis and John Gooding. Archaeology Survey of I-470, Southwest Circumferential, Colorado State Highway Project No. I-470-7(001), Highway Salvage Report No. 14, 1976.

Matthews, Vincent. "A reappraisal of the Seismic-Risk Classification of Colorado,: Mountain Geologist, Vol. 10, No. 4, 1973.

Matthews, Vincent. Private Communication, 1977.

Milliken, J. Gordon, and Trumbley, Anthony S., "Reducing Municipal Water Demand," Denver Research Institute, University of Denver, Denver, Colorado 1977.

Murphy, Joseph R. "Status of a Nesting Golden Eagle Population in Central Utah." Unpublished, 1973.

National Education Association. Rankings of the States. New York, N.Y., 1975.

National Safety Council. Accident Facts. Chicago, Illinois, 1974.

National Water Commission. An Aesthetic Review of the Role of Water in Landscape, prepared by R. Burton Litton et al., University of California, Berkeley, on Contract NWC 70-032. Washington, D. C., 1971.

Olson, Alan P., Thomas Bridge, and Betty Le Free. Chatfield Reservoir Excavations, National Park Service Contract No. CX-1595-5-0197, n.d.

Overton, Richard C. Gulf to Rockies. The University of Texas Press, Austin, Texas, 1953.

Pearl, R. H. Geothermal Resources of Colorado. Colorado Geological Survey, Special Publication No. 2, 1972.

Parks, J. B., George Post, and Tom Thorne. "Isolation of Parainfluenza and Virus from Rocky Mountain Bighorn Sheep." Colorado Division of Wildlife, Game Research Report, Park II, January 1973.

Poor, M. C. Denver South Park and Pacific: A History of the Denver South Park and Pacific Railroad, and Allied Narrow Gauge Lines of the Colorado and Southern Railway Company. The Rocky Mountain Railroad Club, Denver, Colorado, 1949.

Public Service Company of Colorado. Annual Report. 1976.

Pundt, Charles. Denver Election Commission, Denver, Colorado. Personal communication, October 1977.

Rainey, Dave. Colorado and Pacific Railroad Co., Denver, Colorado. Interview of March 31, 1975.

Rawleigh, Barry. Personal communication, 1977.

Regis, Andrew J. Personal communication, 1977.

Ridings, R. N., Forest Supervisor, Pike and San Isabel National Forests, to Regional Forester, Denver, Colorado, Memo of April 14, 1975. L.S. Central Files, BLM/CSO, Denver, Colorado.

Robinson, Peter, University of Colorado. Personal communication, 1977.

Schultz, J. R. and A. B. Cleaves. Geology in Engineering. John Wiley and Sons, Inc., New York, N. Y., 1958.

Scott, Douglas D. and David Gillio. A Report on the Archaeological Impact of the Proposed Foothills Project of the Denver Board of Water Commissioners. Manuscript on file. CH_2M-Hill Company, Bellevue, Washington, 1973.

Scott, G. R. "Cenzoic Surfaces and Deposits in the Southern Rocky Mountains," in Cenzoic History of the Southern Rocky Mountains, G. S. A. Memoir 144, 1975.

Sealing, C. Lee. Colorado Department of Natural Resources, Division of Wildlife, Denver, Colorado. Telephone conversation of March 14, 1975.

Shaddock, Jim, Mountain Bell Telephone Company. Personal communication, 1977.

Shelford, V. E. The Ecology of North America. University of Illinois Press, Urbana, Illinois, 1963.

Simon, R. B. "Seismicity of Colorado: Consistency of Recent Earthquakes With Those of Historical Record," Science, Vol. 165, August, 1969.

Simons, Daryl B. Theory and Design of Stable Channels in Alluvial Materials. PhD Thesis, Colorado State University, 1957.

Spence, J. A. and H. B. N. Hynes. "Differences in Benthose Upstream of an Impoundment." J. Fish. Res. Bd. Canada. January 1971a.

Tolle, William, DWB, Denver, Colorado. Personal Communication 1977.

Tennant, D. L. Instream Flow Regimens for Fish, Wildlife, Recreation, and Related Environmental Resources, Fish and Wildlife Service, Billings, Montana, 1975.

U.S. Department of Agriculture, Soil Conservation Service. Soil Survey of Arapahoe County, Colorado. Prepared in cooperation with the Colorado Agricultural Experiment Station. March 1971.

U.S. Department of Agriculture, Soil Conservation Service. General Soil Map of Douglas County. June 1972a.

U.S. Department of Agriculture, Soil Conservation Service. General Soil Map of Arapahoe County. June 1972.

U.S. Department of Agriculture, Soil Conservation Service. General Soil Map of Jefferson County. June 1972b.

U.S. Department of Agriculture, Soil Conservation Service. Soil Survey of Castle Rock Area, Colorado. Prepared in cooperation with the Colorado Agricultural Experiment Station. November 1974.

U.S. Department of Agriculture, Soil Conservation Service. Soil Survey of the Golden Area, 1977.

U.S. Department of Commerce, Bureau of the Census. Census of Population, 1970, Vol. 1, Part 7, Washington, D. C., 1973, 1976.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration. Local Climatological Data: State of Colorado. 1968, 1969, 1970a.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration. Climatological Summary: State of Colorado. 1968, 1969, 1970b.

U.S. Department of Defense, U.S. Army Corps of Engineers. Draft Environmental Statement, Chatfield Lake, Colorado. Omaha, Nebraska. March 1974.

U.S. Department of the Interior, Bureau of Land Management. Environmental Statement Foothills Project, Denver Board of Water Commissioners. Prepared by the Forest Service, U. S. Department of Agriculture, Rocky Mountain Region, Denver, Colorado, September 30, 1974.

U.S. Department of the Interior, Bureau of Outdoor Recreation Mid-Continent Region. Final Environmental Statement, Roxborough Park, Land and Water Conservation Fund Project No. 08-00419, Douglas County, Colorado. Denver, Colorado, January 28, 1974b.

U.S. Department of the Interior, Bureau of Outdoor Recreation Mid-Continent Region, Outdoor Recreation In The Platte Subregion - A Report Prepared For Use In The Missouri River Basin Comprehensive Framework Study. Denver, Colorado, April 1967.

U.S. Department of the Interior, Bureau of Reclamation. Feasibility Geologic Report of Two Forks Damsite and Reservoir, by N. B. Bennett, III. Washington, D. C., 1966.

U.S. Department of the Interior, Bureau of Reclamation. Earth Manual. Washington, D. C., 1968a.

U.S. Department of the Interior, Bureau of Reclamation (Region VII). Feasibility Geologic Report of Turkshead Damsite, by L. D. Cast. March 1968b.

U.S. Department of the Interior, Bureau of Reclamation. Environmental Study, Upper South Platte Unit, Mount Evans Division, Colorado, and Appendix. International Engineering Company, Inc., Denver, Colorado, May 1973a.

U.S. Department of the Interior, Bureau of Reclamation. Environmental Study, Upper South Platte Unit, Mount Evans Division, Colorado. Denver, Colorado, April 1973b.

U.S. Department of the Interior, Bureau of Reclamation. Field Draft Feasibility Report on Upper South Platte Unit, Pick Sloan Missouri Basin Program, Colorado. Washington, D. C., October 1974.

U.S. Department of the Interior, Bureau of Reclamation. Quality of Water - Colorado River Basin, Progress Report No. 8, January 1976.

U.S. Department of the Interior, Fish and Wildlife Service. The American Eagles and Their Economic Status, by E. R. Kalmbach, R. H. Imler, and L. W. Arnold. Washington, D. C., 1964.

U.S. Department of the Interior, Fish and Wildlife Service, Bureau of Sport, Fish and Wildlife. Progress Report on Fishery Management Programs, Rocky Mountain National Park. Memo by J. W. Mullan. 1972.

U.S. Department of the Interior, Fish and Wildlife Service. Fishery Survey of the Upper South Platte River. Washington, D. C., 1975a.

U.S. Department of the Interior, Fish and Wildlife Service. Instream Flow Regimens for Fish, Wildlife, Recreation, and Related Environmental Resources, by D. L. Tennant. Billings, Montana, 1975b.

U.S. Department of the Interior, U.S. Geological Survey. Quaternary Geology and Geomorphic History of the Kassler Quadrangle, Colorado, by G. R. Scott. U. S. Geological Survey Prof. Paper 421-A. Washington, D. C., 1963a.

U.S. Department of the Interior, U.S. Geological Survey. Bedrock Geology of the Kassler Quadrangle, Colorado, by G. R. Scott. U. S. Geological Survey Prof. Paper 421-B. Washington, D. C., 1963b.

U.S. Department of the Interior, U. S. Geological Survey. Scour and Fill Sand-Bed Structures, by B. R. Colby. U. S. Geological Survey Prof. Paper 462-D. Washington, D. C., 1964a.

U.S. Department of the Interior, U.S. Geological Survey. An Analysis of Some Storm-Period Variables Affecting Stream Sediment Transport, by H. P. Guy. U. S. Geological Survey Prof. Paper 462-E. Washington, D. C., 1964b.

U.S. Department of the Interior, U. S. Geological Survey. Geology of the Platte Canyon Quandrangle, Colorado, by W. C. Peterson. U. S. Geological Survey Bulletin 1181-C. Washington, D. C., 1964c.

U.S. Department of the Interior, U.S. Geological Survey. 1964-1973 Water Resource Data for Colorado, Part 1. Surface Water Records. Prepared in cooperation with the State of Colorado and with other agencies. Lakewood, Colorado, 1964-1973.

U.S. Department of the Interior, U. S. Geological Survey, Bulletin 1181-C, 1964.

U.S. Department of the Interior, U. S. Geological Survey. Quanternary Faulting and Potential Earthquakes in East-Central Colorado, by G. R. Scott. U. S. Geological Survey Prof. Paper 700-C. Washington, D. C., 1970.

U.S. Environmental Protection Agency. Effects of Noise on Wildlife and Other Animals. Memphis State University Contract No. 68-04-0024. Washington, D. C., December 1971.

U.S. Environmental Protection Agency. Denver Regional Draft Environmental Statement for Wastewater Facilities and the Clean Water Program, June 1977.

U.S. Environmental Protection Agency. Denver Regional Draft Environmental Statement for Wastewater Facilities and the Clean Water Program, June 1977.

U.S. Environmental Protection Agency, Office of Enforcement, National Field Investigations, Center-Denver and Region VIII. Report on Effects of Waste Discharges on Water Quality of the South Platte River, Denver Metropolitan Area. Denver, Colorado, June 1972.

U.S. Environmental Protection Agency. Development of an Example 10-Year Air Quality Maintenance Plan for the Denver AQMSA. Prepared by GCA Corporation (Bedford, Mass.). Washington, D. C., 1974.

Vanicek, D. D., R. H. Kramer, and D. R. Franklin. "Distribution of Green River Fish in Utah and Colorado Following Closure of Flaming Gorge Dam." Southwest Nature 14(3)(1970):297-315.

Walker, Wayland, City Planner, City and County of Denver. Personal Communication, 1977.

Ward, James V., Professor of Limnology, Colorado State University, Fort Collins, Colorado. Personal communication, 1942.

Warren, E. R. The Mammals of Colorado. Second edition. University of Oklahoma Press, Norman, Oklahoma, 1942.

Wesche, Thomas A. "Relationship of Discharge Reductions to Available Trout Habitat for Recommending Suitable Streamflows." Water Resources Series No 53. Water Resources Research Institute, University of Wyoming, Laramie, Wyoming, 1974.

Wieder, Clara. South Denver Evergreen Nursery (established in 1920), Denver, Colorado. Personal Communication, 1977.

Windmiller, Ric and Frank W. Eddy. An Archaeological Study of Aboriginal Settlements and Land Use in the Colorado Foothills, National Park Service Contract No. CX-1595-4B-038, Boulder, Colorado, 1975.

Windmiller, Ric and Frank W. Eddy. Archaeological Investigations in the Two Forks Reservoir Area, Colorado: First Quarterly Progress Report. National Park Service Contract No. CX-1200-4B-038, 1974. Boulder, Colorado.

Windmiller, Ric and Frank W. Eddy. Archaeological Investigations in the Two Forks Reservoir Area, Colorado: Second Progress Report. National Park Service Contract No. CX-1200-4B-038, Boulder, Colorado, 1975.

Windmiller, Ric and Frank W. Eddy. *Archaeological Investigations for the Two Forks Dam and Reservoir Alternative, Colorado: Third Progress Report and Recommendations for Mitigation*. National Park Service Contract No. CX-1200-4B-038, Boulder, Colorado, 1975.

Woodward-Envicon. *Draft Environmental Overview, Project Area, Denver Water Board's Eagle-Piney/Eagle - Colorado Water Study*. Report for Parsons, Brinckerhoff, Quade & Douglas, Inc. and Forest and Cotton, Inc., A Joint Venture. San Diego, California, 1973.

GLOSSARY

GLOSSARY

Acre-foot. A unit for measuring volume, equal to the quantity of water or other material required to cover one acre to a depth of one foot or a volume of 43,560 cubic feet.

Archaeological excavation. In a salvage situation in which sites will be destroyed as a result of construction, excavation is often the only means of information salvage. All excavated materials are subjected to intensive laboratory analysis, description, and publication. By definition it is in itself a destructive activity, as the in-place value of the resource is destroyed through excavation.

Archaeological inventory. An inventory is an attempt to locate every site within a specified region, or in the case of a right-of-way, every site along the right-of-way. The inventory requires covering the surface on foot, horseback, or vehicle, in transect intervals of 100 yards or less. An inventory produces as the end product an itemized description of each site, its location on a suitable detailed map, a photograph, and a collection of artifacts from the surface of each site.

Archaeological resources. Objects and areas made or modified by man and the data associated with these artifacts and features. These resources rest in or on the ground.

Archaeological survey. A survey is an extension of an inventory. In addition to site location the site collections are analyzed and each site is assigned to a culture period or periods. The analysis includes laboratory study or artifacts: cleaning, labelling, typological analysis, etc. If acquired, any datable samples are submitted for dating. The site types and artifacts are described in a published report which synthesizes all of the known archaeological data in the region studies.

Artifact. A material object made or modified in whole or in part by man. Among the most common artifacts or archaeological sites are stone tools, chips, projectile points, and similar lithic debris.

Available water-holding capacity (soils). The capacity to store water available for use by plants, usually expressed in linear depths of water per unit depth of soil.

Average annual precipitation. An average of the yearly precipitation usually expressed in inches of water that fall or are computed to fall at a point or on an area during a specified number of calendar or water years.

Axis. (fold) In a fold, a line that connects the central points of each constituent stratum, from which its limbs bend; in a syncline, it is the trough, and in an anticline it is the crest.

Background. That portion of the visual landscape lying from the middleground limits to infinity. Color and texture are subdued in these landscapes, which are concerned with the two-dimensional shape of landforms against the sky.

Base flow. Sustained or fair-weather streamflow. In the most streams base flow is composed largely of ground water effluent.

Baseline data. Information collected prior to the initiation of an environmental analysis which forms a basis for the determination of environmental impacts.

Biochemical oxygen demand (BOD). The measure of the relative oxygen requirements of municipal and industrial wastewaters.

Biomass. Living weight.

Browse. The part of leaf and twig growth of shrubs, woody vines, and trees available for animal consumption.

Calcareous rock. A sedimentary rock containing an appreciable amount of calcium carbonate.

Carrying capacity. The uppermost limit of a specific area's ability to support a given population.

Characteristic landscape. The overall visual impression resulting from the combination of topography, vegetation, water resources, and cultural features that can be described in terms of the visual dominance elements.

Controlled land disturbance. Including mining, oil and gas recovery, to a form and productivity consistent with a stated land use plan which alter the original ground surface and the resources (either surface or subsurface), and require prior approval by the regulatory authority.

Consumptive use. The quantity of water discharged to the atmosphere or incorporated in the products of the process in connection with domestic use, vegetative growth, food processing, or an industrial process.

Cubic feet per second (cfs). A unit expressing rates of discharge, equal to the discharge through a rectangular cross section, one foot wide and one foot deep, flowing at an average velocity of one foot per second.

Cultural resources. Objects, structures, sites, and districts that pertain to native peoples, or other communities; they are generally classified as historic and prehistoric (often referred to as archaeologic). Such areas are important because of their educational, interpretive, and scientific value, because they are vital to the preservation of a subculture, or because they are representative examples.

Degradation. The wearing down or away, and the general lowering or reduction of the Earth's surface by the natural processes of weathering and erosion.

Discharge. The flow of a stream or canal, outflow from a basin, or flow of water from a pipe. Water discharge includes the sediment mixed with and solids dissolved in the water.

Dissolved solids. Solids that originate mostly from rocks and are in solution. Some colloidal material is treated as if it were in solution in determining dissolved solids. The total dissolved mineral constituents of water.

Dissolved oxygen (DO). A measure of the oxygen content of a volume of water.

Ecology. The study of the relation of organism or groups of organisms to their environment; animals and plants in their relation to each other.

Ecosystem. Complex self-sustaining natural which includes living and nonliving components of the environment and the interactions that bind them together. Its functioning involves the circulation of matter and energy between organisms and their environment.

Elaborate. Highly wrought, complicated, complex.

Eolian soil material. Soil material accumulated through wind action.

Erodible. Susceptible to erosion. (Expressed by terms such as highly erodible, slightly erodible, etc.)

Erosion surface. A land surface shaped and subdued by the action of erosion, especially by running water. The term is generally applied to a level or nearly level surface.

Evaporation. The process by which water is changed from the liquid or solid state into the vapor state.

Evapotranspiration. The process by which water is withdrawn from a land area by evaporation from water surfaces and moist soil and by plant transpiration.

Fault. A surface or zone of rock fracture along which there has been displacement, from a few centimeters to a few kilometers in scale.

Fauna. All animals of a particular period or region, taken collectively.

Foreground. That portion of the visual landscape lying generally from one-quarter to one mile beyond the viewer. Details of human-size features are visible at this distance, and all features are large-scale elements.

Form. The three-dimensional shape of an object or a collection of objects that appear as one.

Formation. A distinctive bed or sequence of rocks selected as a convenient unit for mapping, description, and reference.

Fossil. Any remains, trace, or imprint of a plant or animal that has been preserved by natural processes, in the Earth's crust, since some past geologic time; any evidence of past life.

Gaging station. A particular site on a stream, canal, lake, or reservoir where systematic observations of gage height or water discharge are obtained. A streamflow gaging station is a gaging station on a stream.

Gallons per minute (gpm). A unit expressing rates of discharge. One cubic foot per second is equal to 448.8 gpm or 646,272 gpd (gallons per day).

gpd. Gallons per day.

gpm. Gallons per minute.

Ground water. That part of subsurface water that completely saturates the rocks and is under hydrostatic pressure.

Habitat. A specific set of physical conditions that surround the single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

Historical site. Any place associated with a significant event, an important person, or a cultural activity of the past. Historic in most cases is 50 years old or older, except for rare instances where exceptional events have taken place, such as the site of the first atom bomb detonation.

Hardness. A property of water which has generally been associated with the effects observed in the use of soap, or with the deposit left by some types of water when they are heated. Hardness, expressed in terms of an equivalent quantity of calcium carbonate ($CaCO_3$), is calculated from the equivalence of calcium and magnesium, or is determined by direct titration. Hardness caused by calcium and magnesium (and other ions if significant) equivalent to the carbonate and bicarbonate is called carbonate hardness; the hardness in excess of this quantity is called noncarbonate hardness.

Infrastructure. Includes transortation systems, communication systems (including the media), fire protection systems, search and rescue systems, major utilities (gas, electric, fuel oil, water supply and wastewater treatment) health systems, educatio systems, social services and welfare systems, special districts (includes recreation and park districts), recreational services (other than special districts) and aesthetic opportunities, public finance capability, and the land survey grid.

Intermittent stream. One which flows part of the time, as after a rainstorm, or during part of the year.

Invertebrate. An animal without a backbone or spinal column.

Irrigation. The controlled application of water to arable lands to supply water requirements not satisfied by rainfall.

Jackson Turbidity Unit (JTU). Unit used to measure the turbidity or amount of suspended particulate material carried by a stream.

Joint. A surface of actual or potential fracture or parting in a rock, without displacement; the surface is usually plane and often occurs with parallel joints to form part of a joint set.

Landform. A discernible natural landscape, such as a floodplain, stream terrace, plateau, valley, etc.

Landscape visual unit. Smaller land units into which viewsheds are divided. These distinct now-overlapping units are areas that have differing degrees of visual exposure relative to the viewer. They are defined according to their distance (foreground, middleground, and background) from the viewer, the direction(s) of travel along roads from which they may be viewed, and according to the unique combinations of viewshed sequences providing the view(s)

Leach. To dissolve out by the action of a percolating liquid.

Lifestyle. Way of life.

Limiting factor. A critical living or nonliving element of an ecosystem necessary for an organism to survive that is in the least supply.

Lithic Debris. Cultural material made of stone.

Low, medium, and high flows. Arbitrary designations based on the percentage of time a water discharge was equaled or exceeded. High flows are those greater than a discharge that was equaled or exceeded 20 percent of the time; low flows are those less than a discharge that was equaled or exceeded 80 percent of the time; and medium flows are those greater than a discharge equaled or exceeded 80 percent of the time, but less than a discharge equalled or exceeded 20 percent of the time.

Macrohabit. General habitat values that are shared by all species of the same order, family or genus.

Macroinvertebrates. Organisms lacking a spinal cord which inhabit the bottoms of aquatic environments.

Mg/1. Abbreviation for milligrams per liter, the unit of expression for the concentration of dissolved minerals in water.

Middleground. That portion of the visual landscape lying generally from the limits of foreground to 8 miles beyond the viewer. Overall patterns of vegetation and earthform constitute texture which is no longer distinguishable in human-size features.

National Advisory Council on Historic Preservation. An advisory group appointed by the President to oversee national historic preservation policy. Comments on federal undertakings that might effect historic sites.

National Register of Historic Places. A listing maintained by the National Park Service of architectural, historical, archaeological, and cultural sites of local, state, or national significant. (Historic Preservation created by the Act of 1966).

Niche. A faunal species function within the ecosystem.

Normal fault. A fault in which the hanging wall appears to have moved downward relative to the footwall. The angle of the fault is usually 45°-90°.

Paleontology. The study of life in past geologic periods, based on fossil plants and animals and including phylogency, their relationships to existing plants and animals, and the chronology of the earth' history.

Parts per million (ppm). A unit for expressing concentration of dissolved solids and sediment. A part per million of dissolved solids is a unit weight of dissolved solids in a million unit weights of water-dissolved solids solution. A part per million of sediment is a unit weight of sediment in a million unit weights of water-sediment mixture.

Perennial stream. One which flows continuously from source to mouth during most years.

Permeability. (1) The quality of a soil horizon that enables water or air to move through it. (2) The property or capacity of a porous rock sediment, or soil for transmitting a fluid without impairment of the structure of the medium; it is a measure of the relative ease of fluid flow under unequal pressure.

Permeability, soil. The quality of a soil horizon that enables water or air to move through it.

(pH) Hydrogen-ion concentration. The negative logarithm of the concentration of hydrogen ions. The pH is a measure of the activity of the hydrogen ions and thus is a numerical value or measure of the alkalinity or acidity of the water. Ordinarily, water having a pH of 7.0 is regarded as neutral; a pH lower than 7.0 indicates acidic properties; and a pH higher than 7.0 indicates alkalinity. However, a water that is acid, alkaline, or neutral according to the pH scale is not necessarily the same by another standard.

Physical properties (of soils). Those characteristics, processes, or reactions of a soil which are caused by physical forces and which can be described by, or expressed in, physical terms or equations.

Porosity. The property of a rock, soil, or other material containing interstices. It is commonly expressed as a percentage of the bulk volume of material occupied by interstices, whether isolated or connected.

Precipitation. The discharge of water, in liquid or solid state, out of the atmosphere, generally upon land or water surface. The term is also used to designate the quantity of water that is precipitated.

R. Range, one of the north-south rows of townships in a U.S. Public-land survey. (Plural: Rs.)

Rainfall. The quantity of water that falls as rain only. The term is not synonymous with precipitation.

Range. The area occupied by a given species for all or a portion of their lives.

Raptor. Birds of prey with sharp talons and strong notched beaks; hawks, owls, vultures, etc.

Recharge. The process by which water moves into an aquifer, or the amount of water that moves into an aquifer.

Reclamation. The process of returning resource values to lands affected by controlled land disturbances to a form and productivity consistent with a stated land use plan which includes a stable ecological state, is compatible with the values of the surrounding lands, and is executed on lands which are fully capable of supporting the uses or higher or better uses which they were capable of supporting prior to disturbance. (See definition for controlled land disturbance in this glossary, p. G-2.)

Rehabilitation. The process of returning resource values to lands affected by uncontrolled land disturbances to a form and productivity consistent with a stated land use plan which includes a stable ecological state. (See definition for uncontrolled land disturbance in this glossary, p. G-10.)

Restoration, soil. Returned to the original condition.

Return flow. The water returned to the stream system or source after being used. Return flow is generally equal to water use less consumptive use.

Riparian. Situated on or pertaining to the bank of a river, stream, or other body of water.

Riprap. A layer of large, durable, dense, specially selected and graded, broken rock fragments thrown together irregularly (as in deep water or on a soft bottom) to prevent erosion, through wave action or strong currents, and thereby preserve the shape of a surface, slope, or underlying structure. It is used for irrigation channels, river-improvement works, spillways at dams, and shore protection.

Runoff. The water from rainfall or melting snow that enters the stream system rapidly either as overland flow or as subsurface flow that does not reach the zone of saturation and whose time spent underground is so brief that its rate of movement into the stream is almost as rapid as overland flow.

Scouring. The powerful and concentrated clearing and digging action of flowing oil or water, especially the downward erosion by streamwater in sweeping away mud and silt on the outside curve of a bend, or during time of flood.

Sediment yield. A unit for expressing the discharge of dissolved solids or sediment from an area. Sediment yield and dissolved-solids yield is usually given in tons per square mile per year.

Silt. (soil) A soil-texture term used in the U.S. for a rock or mineral particle in the soil, having a diameter in the range of 0.02-0.05 mm; prior to 1937, the range was 0.005-0.05mm. The diameter range recognized by the International Society of Soil Science is 0.002-0.02mms.

Slump. (1) Material that has slid down from high rock slopes. (2) The downward slipping of a mass of rock or unconsolidated material of any size, moving as a unit or as several subsidiary units, usually with backward rotation on a more or less horizontal axis parallel to the cliff or slope from which it descends.

Soil association. A mapping unit used on general soil maps in which two or more defined taxonomic units occurring together in a characteristic pattern are combined on the map into one unit. The components of the soil association may or may not be contrasting.

Soil series. A group of soils having horizons similar in characteristics and arrangement in the soil profile, except for texture of the surface portion.

State Historic Preservation Officer. An appointed official on the state level who oversees the development of historic preservation plans within the state and who provides comments for undertakings that might affect historic properties within the state.

Streamflow. The water discharge that occurs in a natural channel, whether or not the water discharge is affected by regulation or underflow.

Succession. The progressive development of vegetation toward its highest ecological expression, the climax; replacement of one plant community by another.

Suspended sediment. Sediment that is supported by the upward components of turbulent currents, or by colloidal suspension if the sediment particles are very small.

T. Township, a tract of land that is bounded on the east and west by meridians six miles apart at its south border, has a north-south length of six miles, and forms one of the chief divisions of a U.S. public-land survey. (Plural: Tps.)

Terrestrial. Consisting of or pertaining to the land in distinction from water.

Texture. The visual arrangement of the parts of a landscape feature. What constitutes texture depends on the object's distance from the viewer; the dominant texture of trees, for example, is leaves or boughs in the foreground, individual trees or groves in the middleground, and forests in the background.

Topsoil. Natural earth materials at or adjacent to the land surface, with physical and chemical characteristics necessary to support vegetation.

Turbidity. The measure of the degree of light penetration produced in water by materials suspended in the water.

Uncontrolled land disturbance. Includes fire, floods, landslides earthquakes, or other types of disturbances arising from natural causes, catastrophic occurrences, or uncontrolled human activity, which usually results in the destruction or degradation of the resource values on the lands affected.

Vertebrate. An animal having a backbone or spinal column.

Viewshed. A land unit bounded by topographic features that define the limits of views from within the unit. Adjacent viewsheds may share common topographic boundaries, or they may overlap if portions are visible from more than the unit's one viewshed sequence.

Viewshed sequence. A road segment contained by a viewshed; a new viewshed sequence begins when the road enters a new or overlapping viewshed.

Viewshed sequence points. The points on a road where one viewshed sequence ends and another begins.

Visitor day. Participation in an outdoor recreation activity by one user or a combination of users that is equivalent to one 12-hour recreation visit.

Visual dominance elements. The four "building blocks" of the visual landscape that can be used to describe what is seen: form, line, color, and texture.

Water table. The water table is that surface in an unconfined water body at which the pressure is atmospheric. It is defined by the levels at which water stands in wells that penetrate the water body just far enough to hold standing water. In wells which penetrate to greater depths, the water level will stand above or below the water table if an upward or downward component of groundwater flow exists.

Water yield. The runoff from a drainage basin.

★U.S. Government Printing Office: 1977-782-003 Region 8

Bureau of Land Management
Library
Denver Service Center

Form 1279-3
(June 1984)

BORROWE

TD 195 .W3 F66 1

Proposed Foothil

DATE LOANED

BORROWER

USDI - BLM